

# Absorption Cooling Unit Diagram

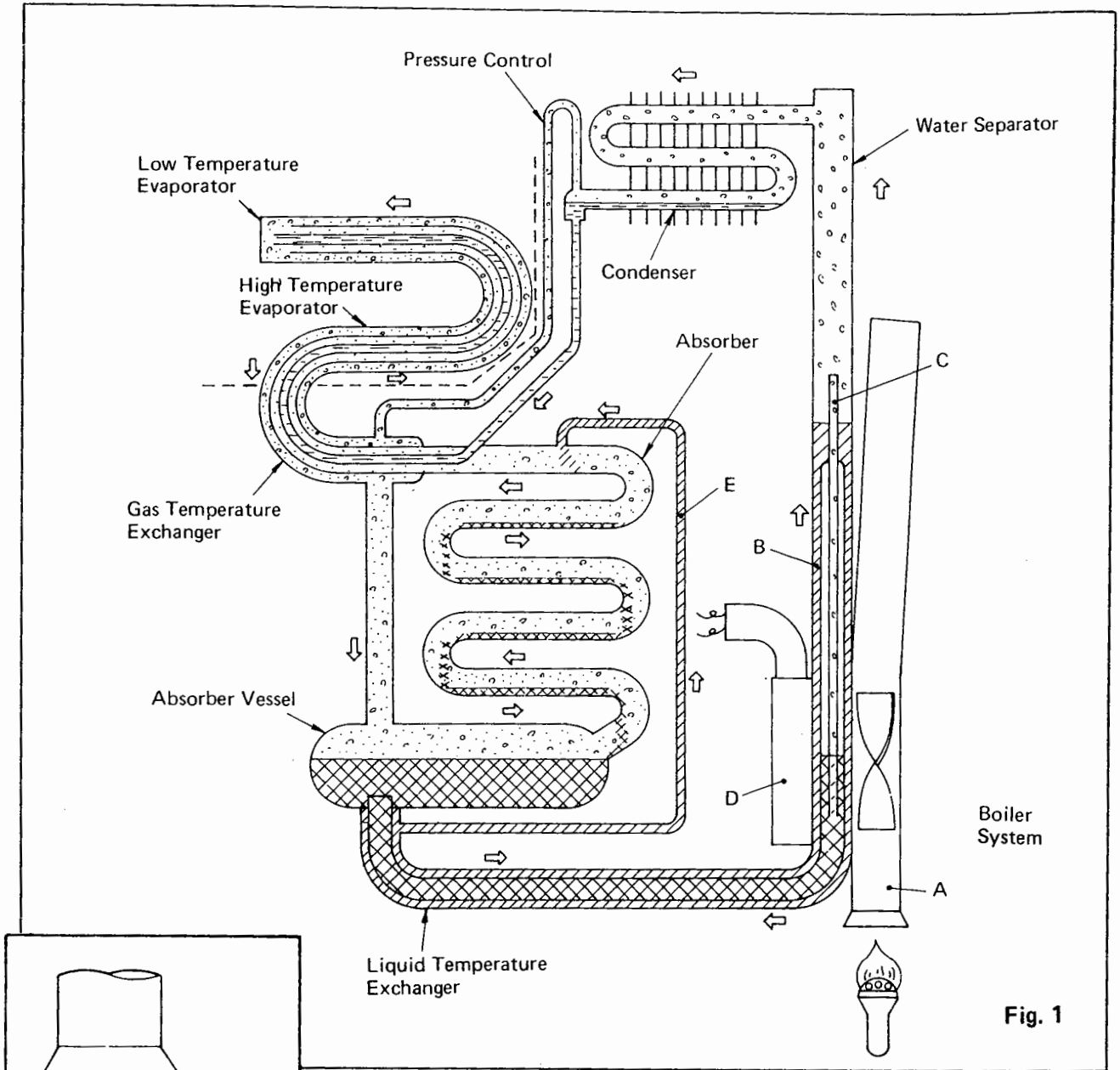
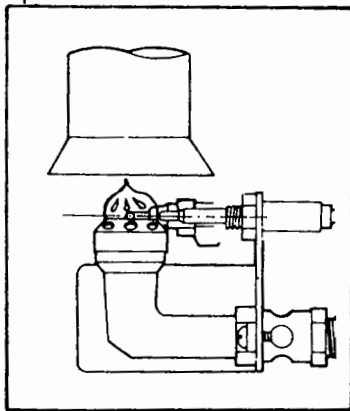








Fig. 1



The correct flame, at "COLDEST" setting, should have a bright blue crown at the base of the flame and a slight buzzing noise.

### Liquid Heat Exchanger

- |   |                              |   |                         |
|---|------------------------------|---|-------------------------|
|  | Ammonia Vapor                |  | Hydrogen Gas            |
|  | Ammonia Hydrogen Mixed Vapor |  | Strong Ammonia Solution |
|  | Weak Ammonia Solution        |  | Liquid Ammonia          |

# 1. The Absorption Type Cooling Unit

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The continuous absorption type of cooling unit is operated by the application of a limited amount of heat, gas, electricity or kerosene. No moving parts are employed.

The unit, (see Fig. 1), consists of four main parts - the boiler system, condenser, evaporator and absorber. All the parts are connected by tubes, the whole construction being of steel welded together.

The unit (in Fig. 1) can either be run on electricity or gas. On the picture the unit operates on LP gas.

The unit charge consists of a quantity of ammonia, water and hydrogen under pressure sufficient to condense ammonia at ordinary room temperature. The unit is then sealed off.

Some of the ammonia, in a relatively strong solution in water, is in the boiler system. When heat is supplied at point A on the picture (LP gas), bubbles of ammonia gas are produced which rise and carry with them quantities of weak ammonia solution. This weak solution passes into the tube (B) and ammonia vapor rises into the water separator. Here any water vapor is condensed and runs back into the boiler system leaving the dry ammonia vapor to pass to the condenser.

Air circulating over the fins of the condenser takes up sufficient heat from the ammonia vapor to cause it to condense to liquid ammonia in which state it flows into the low temperature evaporator, situated at the base of the frozen storage compartment. The ammonia passes from the low temperature evaporator into the high temperature evaporator, situated at the rear inside the cabinet.

The low temperature evaporator and the high temperature evaporator are also supplied with hydrogen. The hydrogen passes across the surface of the ammonia and lowers the ammonia vapor pressure sufficiently to allow the liquid ammonia to evaporate. The evaporation of the ammonia extracts heat from the evaporator and from the food storage space, thereby lowering the temperature inside the refrigerator.

The mixture of ammonia and hydrogen vapor passes from the evaporator to the absorber vessel.

Entering the upper portion of the absorber is a continuous trickle of weak ammonia solution fed by gravity from the tube (E). This weak solution, flowing down through the absorber, comes into contact with the mixed ammonia and hydrogen gases and readily absorbs the ammonia from the mixture, leaving the hydrogen free to rise through the absorber coil and to return to the evaporator. The hydrogen thus circulates continuously between the absorber and the evaporator.

The strong ammonia solution produced in the absorber flows down to the absorber vessel and thence to the boiler system, thus completing the full cycle of operation.

The liquid circulation of the unit is purely gravitational. It is therefore essential that the unit stands upright.

Heat is generated in the absorber by the process of absorption. This heat must be dissipated into the surrounding air. Heat must also be dissipated from the condenser in order to cool the ammonia vapor sufficiently for it to liquefy. Free air circulation is therefore necessary over the absorber and condenser.

The whole unit operates by the heat applied to the boiler system and it is of paramount importance that this heat is kept within the necessary limits and is properly applied.

When the unit operates on electricity a heating element is fitted in the pocket (D) and the pump tube (C) will start to operate.

## 2. The Domestic Refrigerator

The domestic refrigerator is a cabinet designed to keep perishable foodstuffs in a wholesome condition for a sufficiently long period to meet household requirements. To do this, a temperature of between 35° F (2° C) and 50° F (10° C) has been found most suitable, and the refrigerator must be capable of maintaining this temperature under the most severe conditions likely to be met.

The cabinet is an insulated container, fitted with shelves, and provision made for the storage of frozen foods and the freezing of water into icecubes of convenient size for household use.

In order to maintain the cabinet at the relatively low temperatures necessary for the storage of food and the making of ice, heat has to be extracted from the foodstuffs, the air admitted to the cabinet every time the door of the refrigerator is opened, the small amount of heat that enters through the insulated walls of the cabinet and from the water in the ice trays. The sum of these items constitutes the load on the cooling unit.

The Frozen Storage Compartment is inside the cabinet and attached to the Evaporator (that portion of the unit where the cooling effect is produced), consequently it is maintained at a low temperature.

The evaporator temperature is normally some 5° F (-15° C) below the average cabinet temperature when the refrigerator is working in room temperatures of approximately 77° F (25° C), and this temperature difference will be increased or decreased by a rise or fall in the room temperature.

Inside the cabinet the air around the evaporator is cooled, becomes heavier and moves downwards. As it passes over the foodstuffs it extracts heat, becomes lighter and rises, thus creating an air circulation within the cabinet. (See Fig. 2.) The coldest position in the cabinet is immediately below the evaporator.

A thermostat or temperature regulator, which automatically controls the cabinet temperatures, is fitted to all models.

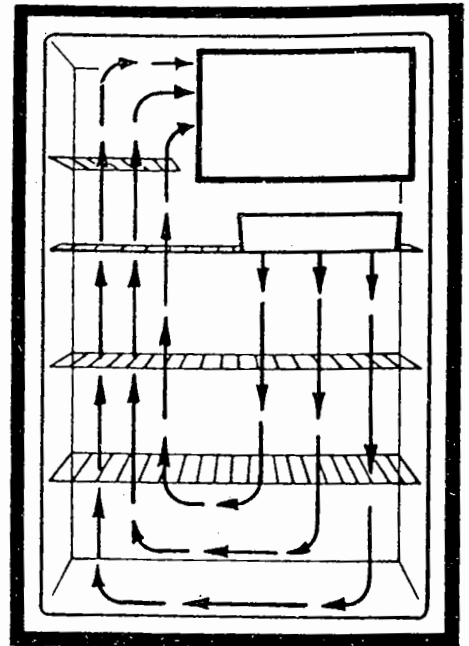
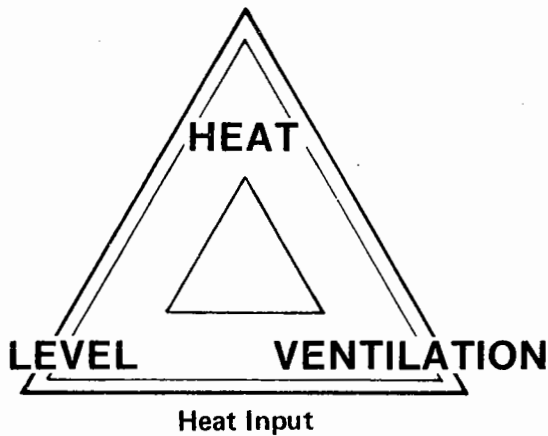


Fig. 2 Air Circulation

### 3. Three Points To Remember

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1. Will refrigerator work on gas but not on electricity? If so, first check line pressure at range. It should read 11" water column with two (2) range burners on.
2. Adjust tank regulator if necessary.
3. Check for obstruction in gas line.
4. Maximum pressure should be 10.5" to 11.5" water column to prevent hot air from accumulating on top of the refrigerator.
5. Determine if burner orifice is proper size and clean. As orifices are precision drilled and extremely small it is difficult to detect any obstruction visually. If any doubt, replace with new orifice or clean the orifice by rinsing in alcohol or M.E.K and blowing out with air.  
**NEVER REAM OUT.**
6. If burner will not stay lit, check thermoelement for proper location, loose connection, and millivolt out put.
7. Check flue baffle.
8. Is burner located properly in relation to the generator?
9. Will refrigerator work on electricity but not on gas?
10. Is power cord plugged in? With Volt/Watt meter check for proper wattage draw. (Heaters are designed to draw rated wattage if supply of current is between 115 and 120 volts. If voltage is otherwise then watt reading will be different.

Example: If voltage is 10% lower than rated, then watt meter reading will be approximately 20% lower.

11. If volt reading is 115 to 120 volts, but watt reading is low then check for loose connections or defective heater.
12. If watt reading is zero, check continuity of circuit through.
  - a. Power plug & cord.
  - b. Slide switch or snap switch.
  - c. Thermostat.
  - d. Heater element.

#### Ventilation

1. Is installation made according to specifications? (page No. 8).
2. Must have louvered service door at lower rear of air inlet through floor at rear of refrigerator, either of which must have minimum free air opening of 40 square inches for models SRA0321 / A0331, 50 square inches for models SRA0621 / A0631, SRA0721 and SRA1221.
3. Must have roof vent directly over condenser with free air opening of 60 square inches for models SRA0321 / A0331, and 92 square inches for models SRA0621 / A0631, SRA0721 and SRA1221.
4. Any dead air space above refrigerator must be blocked off to prevent hot air from accumulating on top of the refrigerator.

5. Any deviation from these specifications which reduces the flow of air over the condenser, will seriously affect the performance of the refrigerator.
6. In border line cases of restricted air flow, a small fan can be utilized when ambient temperatures are above normal.
7. Has any obstruction developed which would reduce air flow such as:
  - a. Insulating material, bird nests or other objects which may have fallen onto the condenser or plugged the roof vent.
  - b. Has customer failed to remove filter or baffle from the service door.

#### **Level**

1. Make sure customer understands the importance of leveling on the freezer plate.
2. Explain the circulation of the refrigerant gases and that the unit is designed in such a manner that if the freezing plate is level, then the complete unit will have the proper gravity return.

## LEVELING AND WHY

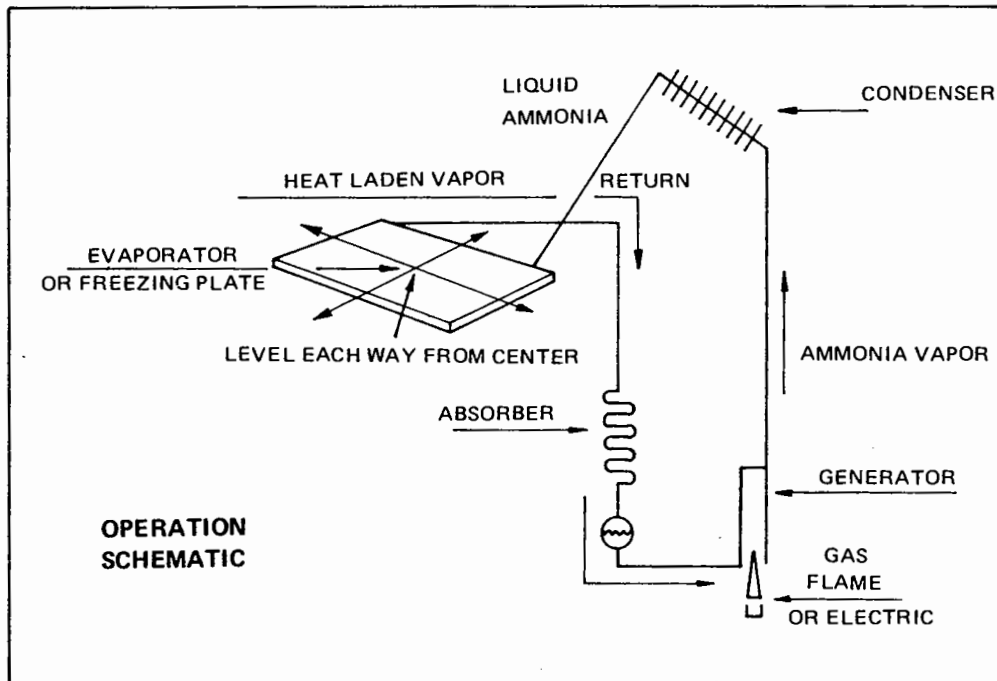


Fig. 3

Your gas absorption refrigerator is powered by an L.P. gas flame permitting you to have silent refrigeration wherever you go, and in order for this to be possible and practical, certain conditions must be met.

First of all the freezing unit is one that uses heat as a source of power. The heat generated either by gas flame or electricity circulates the refrigerant in the form of a vapor up through the condenser where it is changed to a liquid.

From this point it flows down through the freezing zone (or freezing plate) on its way back to the generator, completing the cycle.

When the liquid ammonia passes through the freezing plate it is again changed into a vapor by heat absorbed from the food and cabinet area.

If this heat laden vapor is trapped or partially trapped by liquid ammonia preventing it from passing out of the evaporator (or freezing plate) due to an unlevel condition, the results will be a total or partial loss of refrigeration. For this reason take a little time to level the freezing plate using a small pocket level (see schematic) and adjust the trailer so that this point (center of freezer plate) is level in each direction. (see Fig. 3)

The refrigerator is normally installed with the freezing plate level in relation to the floor (center) of trailer, if you find this true, then level the trailer floor; if not level from the plate.

### Operation In Transit:

While the refrigerator must be level when the trailer is stopped, the refrigerator has been so designed that it will perform during transit.

When your trailer or camper is moving a washing action caused by the motion will prevent any liquid from trapping this vapor on its way back to the generator for recirculation, in addition traveling creates more air circulation for the air cooled unit, resulting in improved performance.

## 4. Installation Instructions For LP Gas Refrigerators

### General

Special care is necessary with the installation of LP gas refrigerators in trailers to ensure, firstly safety in operation, and secondly satisfactory operation under conditions that are usually much more difficult than those cases with the normal home installation.

The refrigerator must be installed on a firm floor and must be level. The latter point should be checked by using a spirit level and level both ways in the freezer compartment.

A continuous movement, as in the trailers on tow, will not affect the operation if the rolling or pitching passes either side of level.

The operation will be least affected if the refrigerator is installed with the door parallel to the side wall of the trailer.

Whenever the trailer is parked, care should be taken that it is accurately leveled. When parking try to avoid having the wind blowing directly against the wall where the vent outlets are located.

The refrigerator must be securely fixed so that it will not move when the trailer is in motion, but there should be means of relocating for easy service access.

Screw holes for securing the cabinet to the recess floor are provided in the cabinet support rails.

An access door on the outside wall at the back of the refrigerator must be installed for easy servicing.

The LP gas refrigerators are of air-cooled type. Therefore it is of utmost importance that the air circulation round the unit parts behind the cabinet is unrestricted. Good refrigeration performance is dependent upon adequate ventilation of the refrigerator enclosure. This will be achieved by following instructions as shown in Figs. 4-A to 4-C.

Some methods of installation are shown in Figs. 4-A-C. Each method has the inlet vent located on the side of the trailer or mobile home. Installation "A" is recommended for models SRA0321/A0331 and installation "B" is recommended for models SRA0621/A0631, SRA0721 and SRA1221. Installation "A" may be also used for models SRA0621/A0631 and SRA0721.

### Important

The refrigerator must be completely enclosed at the top, bottom and sides. All joints in the enclosure must be tight to assure that no combustion products enter into the living area.

Make sure that no part of the vent chimney walls cover the cooling unit and that the louvers in the sidewall vents are obstructed.

Any dead space above the refrigerator should be sealed off at the rear top corner of the refrigerator cabinet.

All surfaces in the ventilation channel must be protected with a fire resistant material.

# 5. Installation Of Refrigerators In Trailers

The following figures show suggested ways of installations.

**VENT KIT NO. 746H-5**  
**RECOMMENDED INSTALLATION**  
**FOR MODELS SRA0321 / A0331**  
 (Alternate installation for  
 Models SRA0621 / A0631 and SRA0721)

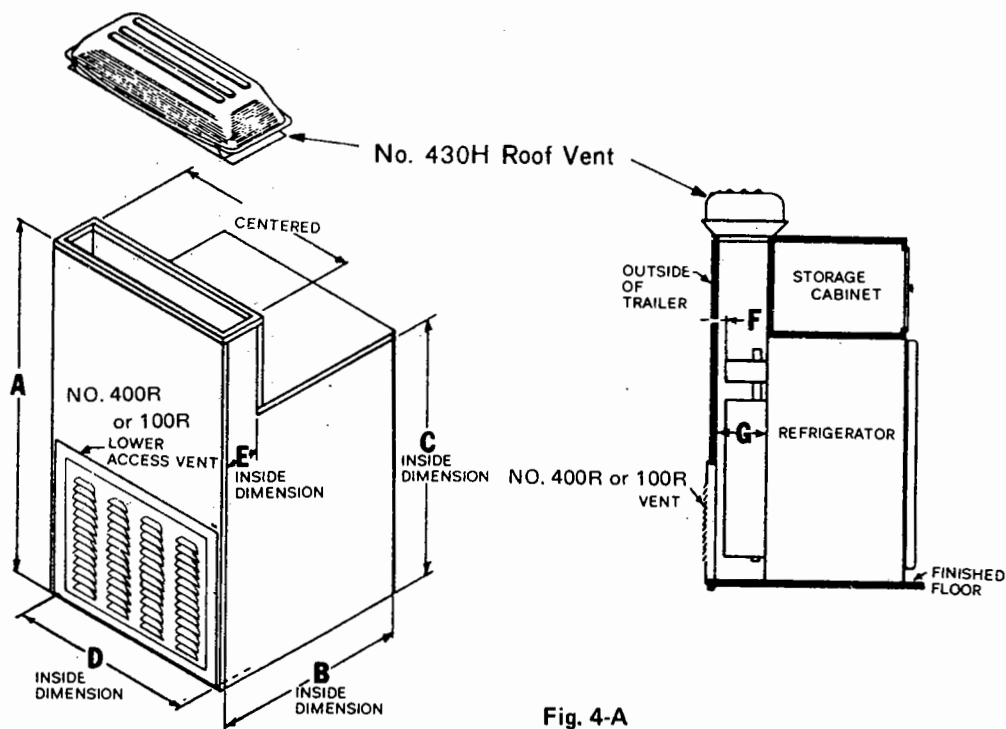
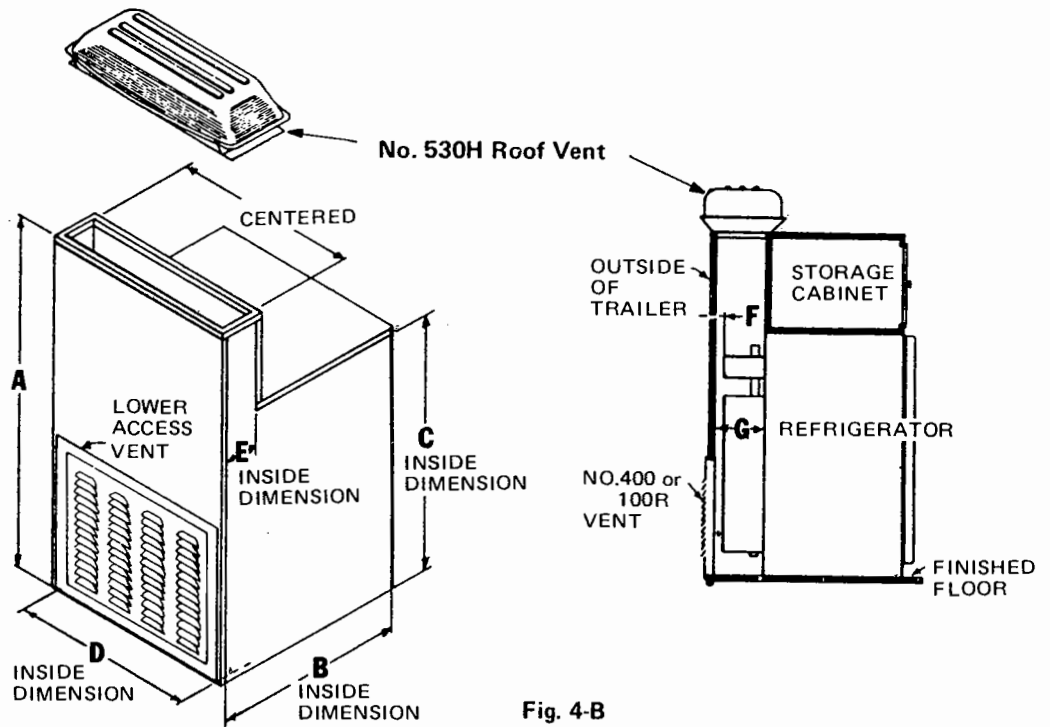


Fig. 4-A

Model No.	A		C	D	Recommended				Minimum			
	Min.	Max.			B	E	F	G	B	E	F	G
SRA0321 SRA0331	31-3/4	78-13/16	28-3/4	20-1/2	19-15/16	4-1/2	1	4-1/2	18-15/16	3-1/2	0	3-1/2
SRA0621 SRA0631	42-3/16	83-7/8	39-3/16	21-7/8	24	5-1/8	1	5-1/8	23	4-1/8	0	4-1/8
SRA0721	56-3/4	83-7/8	53-3/4	23-7/8	24-3/4	5	1	5	23-3/4	4	0	4



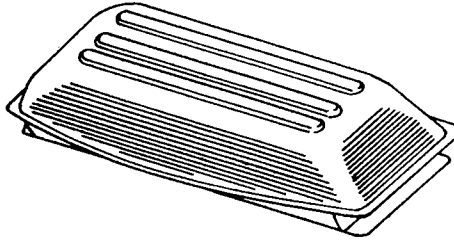
**VENT KIT NO. 846H-2A**  
**RECOMMENDED INSTALLATION**  
**FOR MODELS SRA0621 / A0631,**  
**SRA0721 and SRA1221.**



Model No.	A		C	D	Recommended				Minimum			
	Min.	Max.			B	E	F	G	B	E	F	G
SRA0621 SRA0631	42-3/16	83-7/8	39-3/16	21-7/8	24	5-1/8	1	5-1/8	23	4-1/8	0	4-1/8
SRA0721	56-3/4	83-7/8	53-3/4	23-7/8	24-3/4	5	1	5	23-3/4	4	0	4
SRA1221	60-5/16	83-7/8	57-5/16	23-7/8	24-3/4	5	1	5	23-3/4	4	0	4

APPROVED VENTING COMPONENTS

No. 530H ROOF VENT  
Cutout Requirements  
5-1/8 x 23-3/4  
Unit has sheet metal  
base and ABS plastic top.



No. 430H ROOF VENT  
Cutout Requirements  
4-1/2 x 20-1/2  
Unit has sheet metal  
base and ABS plastic top.

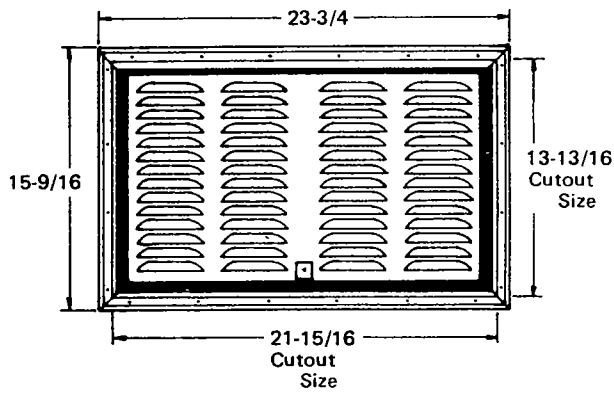


Fig. 4-C

No. 400R LOWER ACCESS VENT

Note: 100R Lower Access Vent  
Less Screw Cover & Keyed Lock

## 6. Gas Line

LP gas is highly inflammable and it is of extreme importance to ensure not only that all joints in piping carrying the gas from the storage bottle to the appliances burning are — and will remain — absolutely gas tight, but that any non-metallic packings used in such joints are made from materials that will not deteriorate from contact with LP gas.

The gas line should be free of kinks and sharp bends. After installation, the gas should be turned on, and all joints in the gas line must be checked for leaks up to the burner by use of soap and water solution. This check should be exercised periodically.

Do not fit any extension to the top of the flue. This is not only unnecessary, but can create draught conditions which can adversely affect correct combustion at the burner and consequently, the functioning of the cooling unit.

The refrigerator should be operated at an inlet gas pressure of 11" W.C. (2.75 kPa). Refer to Para. 20.

Incoming gas pressure is controlled by the pressure regulator on the propane/butane bottle.

## 7. Structure Of Gas Combustion System

The system is shown in Fig. 5.

The Gas combustion system consists of the following three main parts. Safety Device, Gas Thermostat, Burner. Refer to Para. 8, 10 and 14.

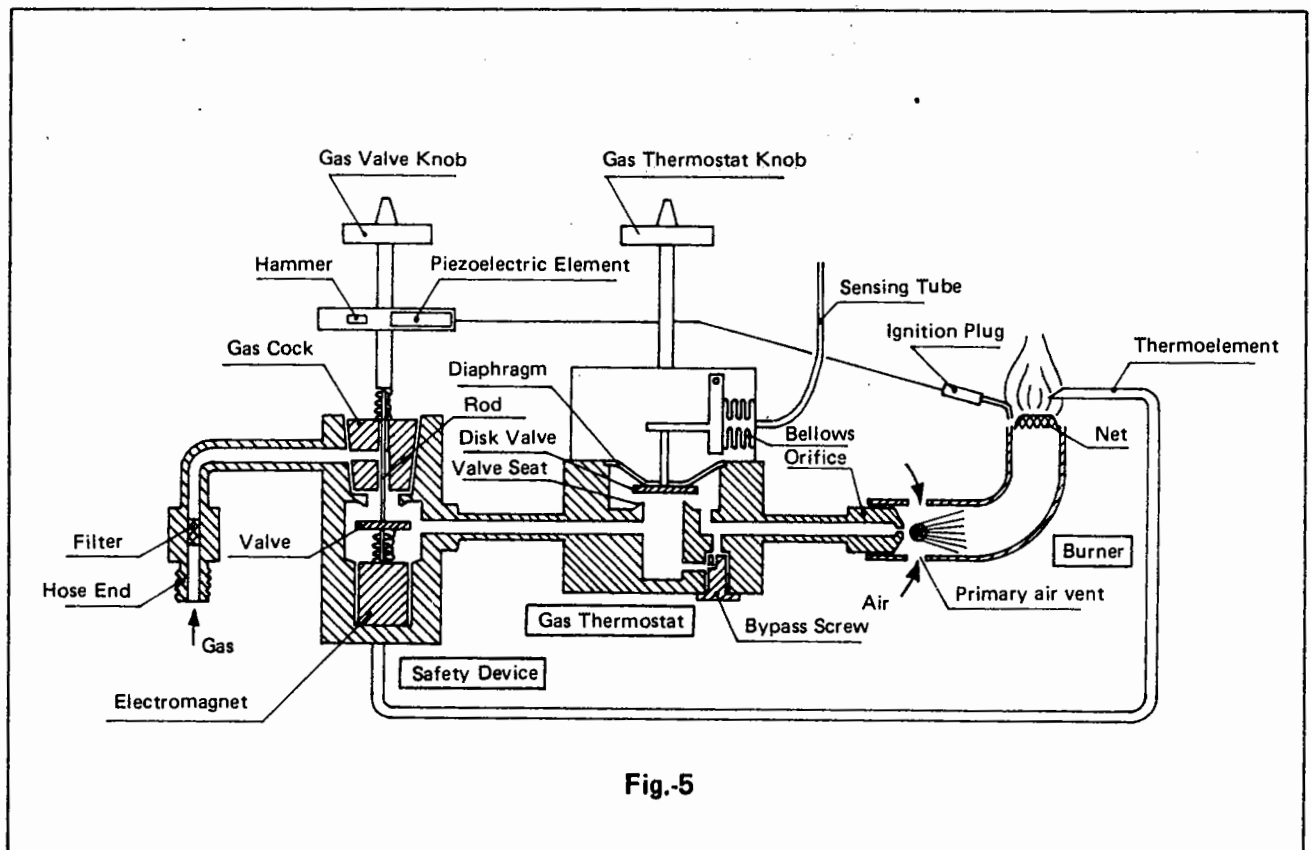


Fig.-5

## 8. The Gas Thermostat(Type DGR)

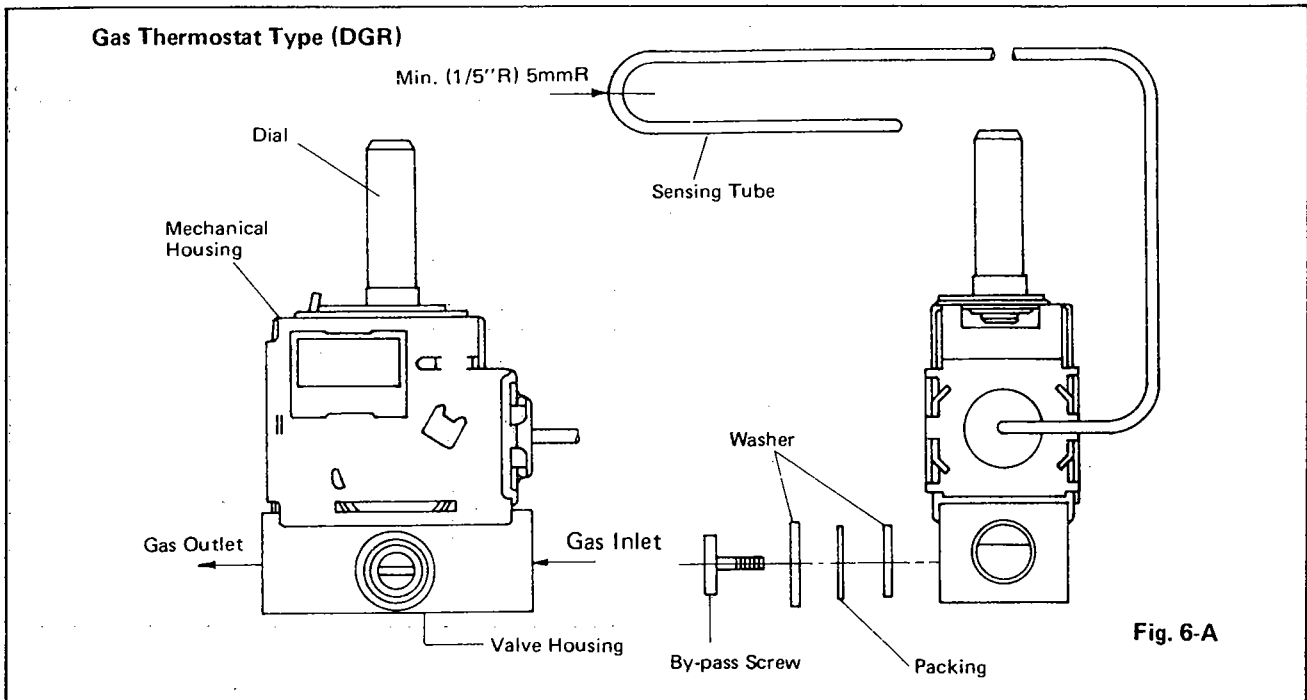


Fig. 6-A

### 8-1. Thermostat Construction

The construction is shown in Figs 6-A, 6-B.

The thermostat unit consists of the following three main parts. Bellows system, Mechanism, and Valve housing.

#### 1) Bellows System

The system consists of a spring and Operating Lever-loaded bellows and a sensing tube, which is bended at about 3" from its free end.

#### 2) Mechanism

The Operating Lever-load of the bellows can be regulated by turning the thermostat dial. The movement of the bellows to be caused by the change of temperature at the sensing tube is transmitted to the disc valve which governs the regulation of gas flow.

#### 3) Valve Housing

The valve housing has an inlet and an outlet fitted with internal threads NPT 1/8.

The valve housing contains a disc valve, a diaphragm, a spring, and a by-pass screw.

The diaphragm has a function of preventing gas leak from the housing.

4 screws are used to combine the mechanical housing with the valve housing.

### 8-2. Thermostat operation

The control dial of the thermostat provides for a wide range of cabinet temperature. Set on "COLDEST", the burner will operate on full flame continuously and the maximum cooling effect of the unit will be obtained. Any of the marked settings on the scale provides for cut-off of the main flame (allowing only by-pass flow to the burner) and immediately the temperature of the evaporator at the thermostat sensing tube rise to the level provided by the thermostat dial's setting.

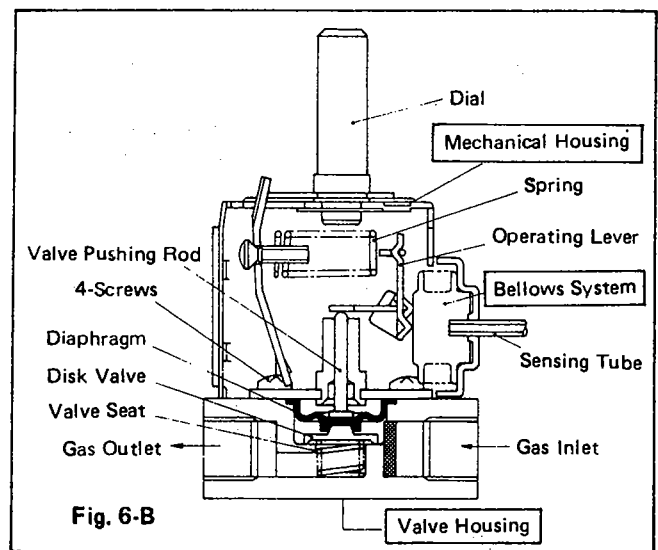


Fig. 6-B

### 8-3. Cleaning valve or valve seat in the DGR thermostat

Dirt on the thermostat gas valve or seat prevents the thermostat valve from completely closing, consequently it lets through some gas when in closed position.

This condition may prevent reducing the flame to the required minimum. It will cause too low cabinet temperature. This can be controlled by turning the thermostat dial to "DEFROST". If the flame does not go down to the low flame (by-pass flame) it will be necessary to clean the thermostat valve and valve seat.

#### Note:

The thermostat valve will not close to by-pass on setting "DEFROST", unless the free end of the thermostat sensing tube is cooled down to at least 5° C (40° F).

Proceed as follows:

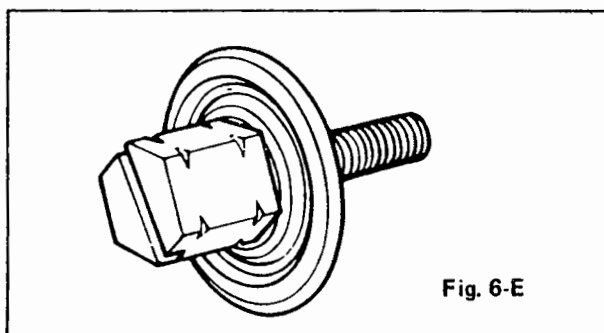
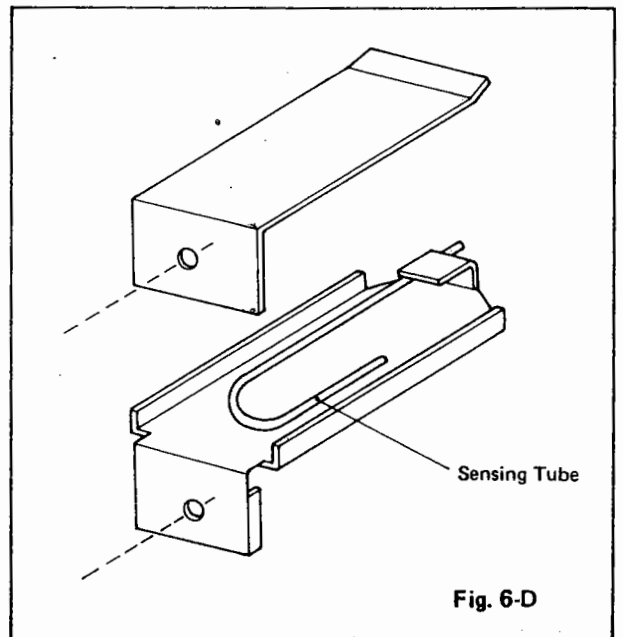
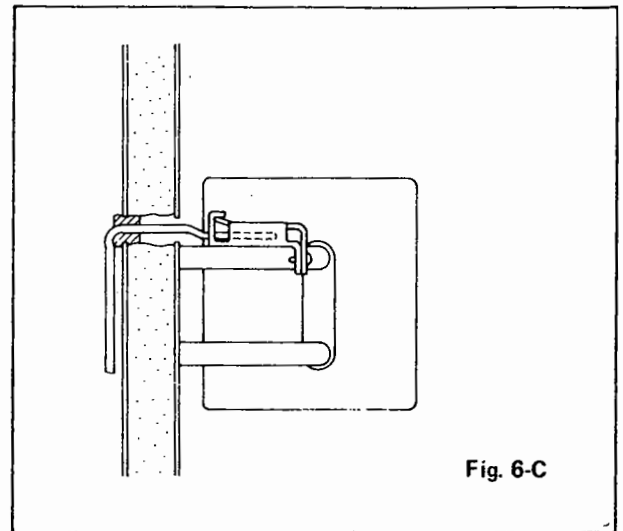
Remove 4 screws for access to valve housing, disc valve, and diaphragm and then clean valve and valve seat. See Fig. 6-B.

Note: When replacing the thermostat unit, it must be sure that the end of sensing tube is bended as shown in Fig. 6-A and a sensing tube is fastened on the holder located at the evaporator as shown in Figs. 6-C, 6-D.

### 8-4. By-pass screw clogged

When the required cold temperature inside the cabinet is reached, the thermostat shuts off the main gas supply to the burner; however, a small amount of gas is still passing through the by-pass, enough to keep the feeler of the flame failure device heated all the time, as already stated above. There is a very slight possibility that the by-pass screw hole is partially clogged.

If this is the case, take out the by-pass screw and clean it. It is located on the valve housing of DGR gas thermostat. Be sure to clean the by-pass screw by rinsing in alcohol or M.E.K and blowing out with air.



## 9. The Electric Thermostat (Type ATB)

### Electric Thermostat

The construction is similar to the gas thermostat except the bellows system operates a switch that makes and breaks connection in the electrical circuit as required to maintain a constant temperature in the refrigerator.

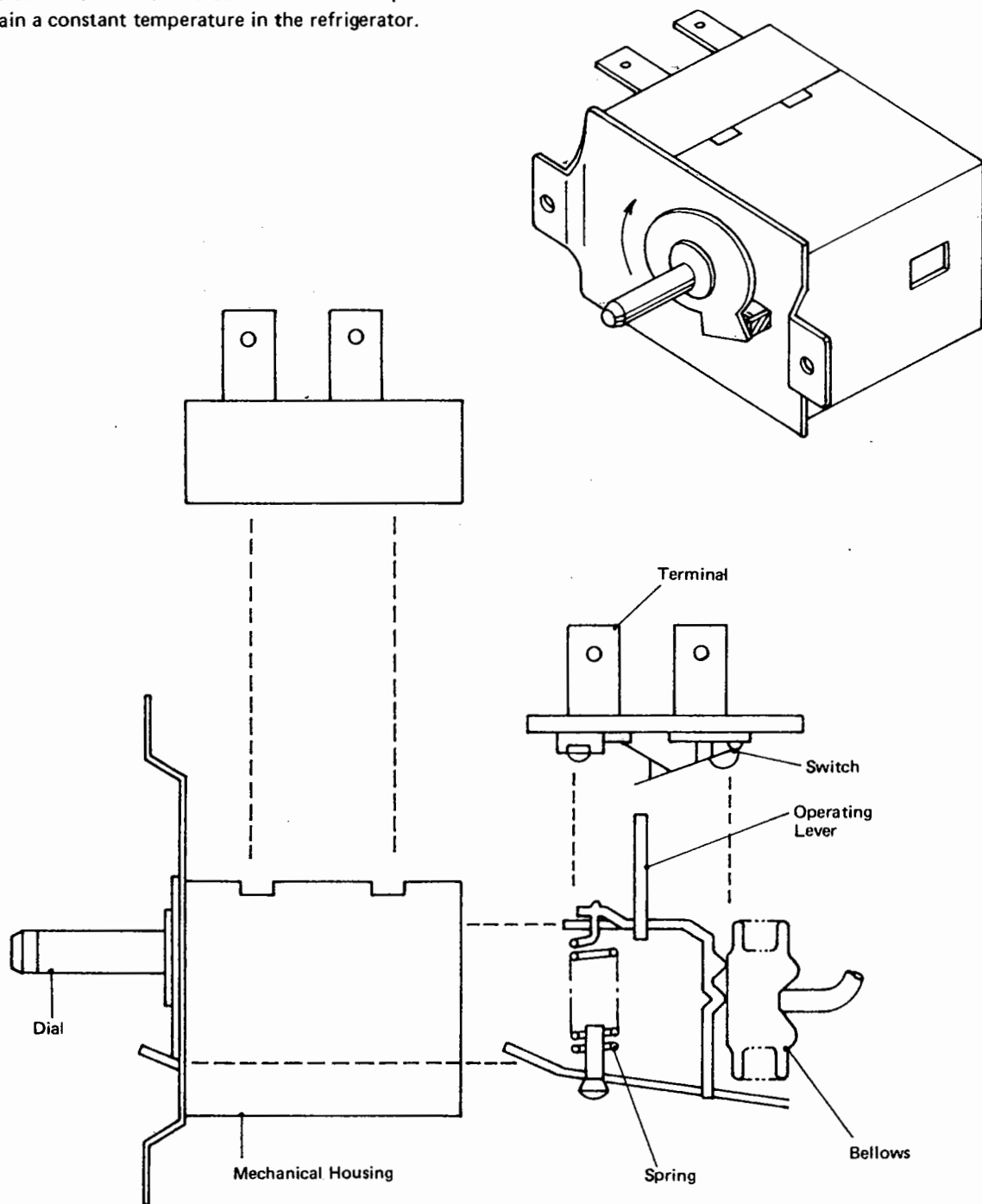
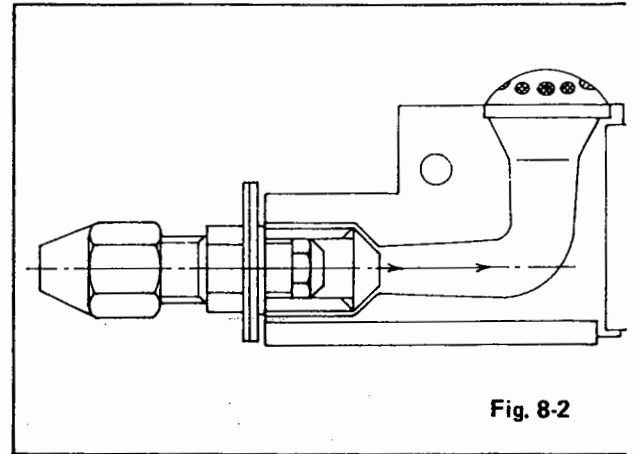
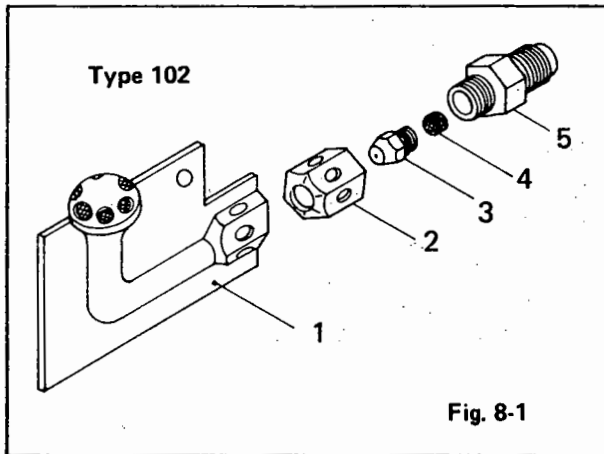


Fig. 7

## 10. Gas Burner

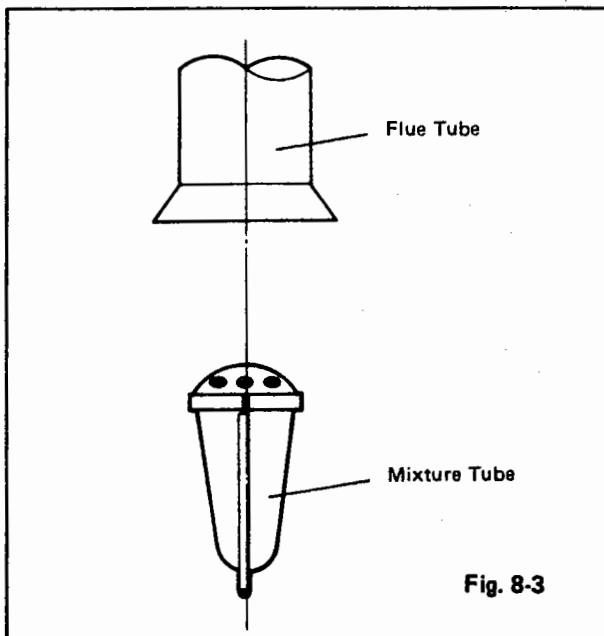
The gas burner consists of the following parts:

- |                   |                  |
|-------------------|------------------|
| 1. Mixture tube   | 4. Burner filter |
| 2. Burner Holder  | 5. Burner Joint  |
| 3. Burner Orifice |                  |



It is most important to ensure the following conditions when setting up the burner.

1. The mixture tube is inserted into the burner holder, and fixed with the bracket and the burner joint.
2. When the burner orifice is screwed to the burner joint, be sure that it is clean.
3. Position the mixture tube in such a way that its center line should be aligned center-to-center with the flue tube axis.
4. Look for spiders in burners.



# 11. Burner Orifice & Mixture Tube

## 11-1. Burner Orifice

The burner orifice size is indicated by a number stamped on the side of the hexagonal head with color identification.

Be sure to clean the orifice by rinsing in alcohol or M.E.K and blowing out with air. Don't use a pin or the like in cleaning the orifice so as to avoid enlargement of the orifice diameter and damage.

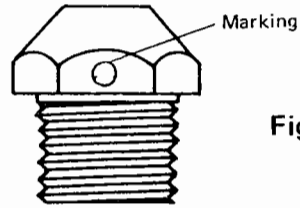


Fig. 9

\* Orifice Marking (Refer to Table 1.)

Cooling Unit, Orifice, and Mixture Tube for Different Refrigerators

Table 1

Model	Cooling Unit	Orifice Parts No.	Orifice Marking	Orifice Color	** Mixture Tube Marking	Input Rate (Btu/hr)
SRA0321 SRA0331	833-0-0003-165-00	833-2-9260-002-00	29	Orange	M102R	800
SRA0621 SRA0631	833-0-0003-175-00	833-2-9260-001-00	34	White	M102P	1200
SRA0721	833-0-0003-184-00	833-2-9260-003-00	39	Green	M102M	1600
SRA1221	833-0-0003-185-00	833-2-9260-003-00	39	Green	M102M	1600

Refer to Cooling Unit section of each model's Spare Parts Lists.

## 11-2. Mixture tube

There are 3 different kinds of mixture tubes available for gas burner.

The type identification marks are engraved on the flange of mixture tube.

\*\* Mixture Tube Marking (Refer to Table 1.)

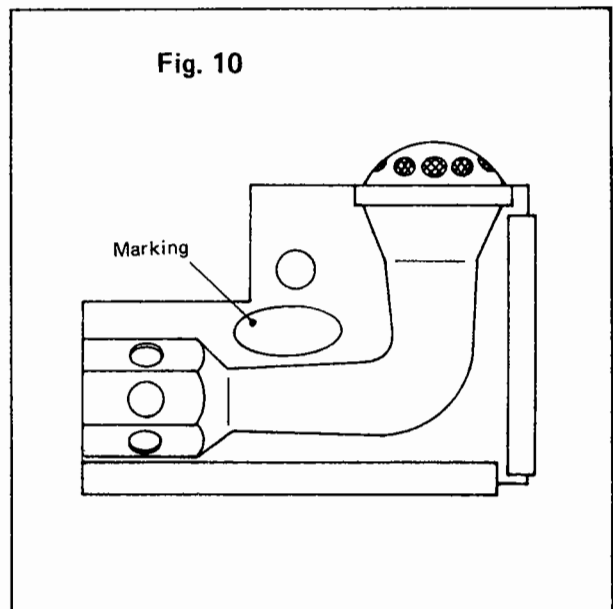
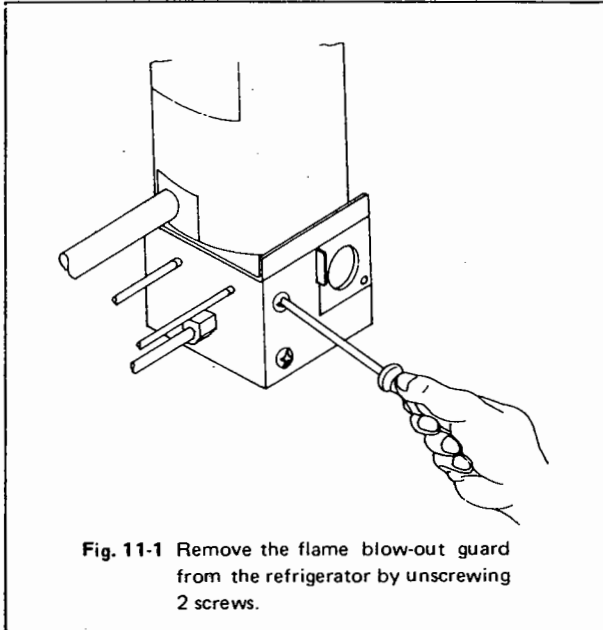


Fig. 10

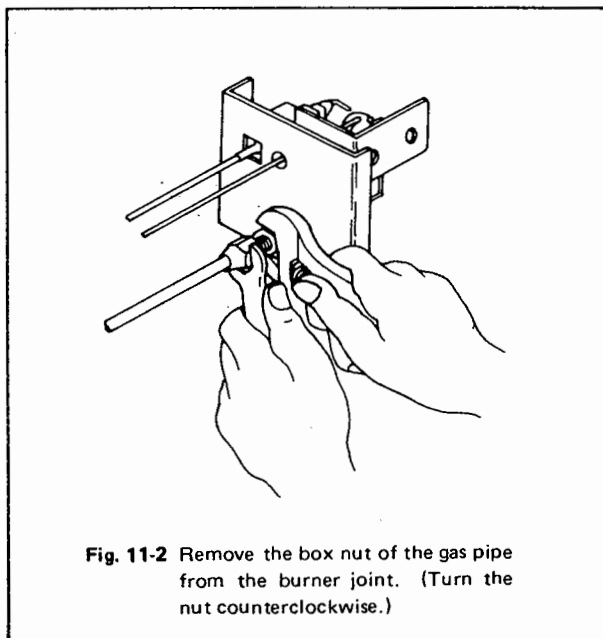


## 12. Burner Orifice Clogged

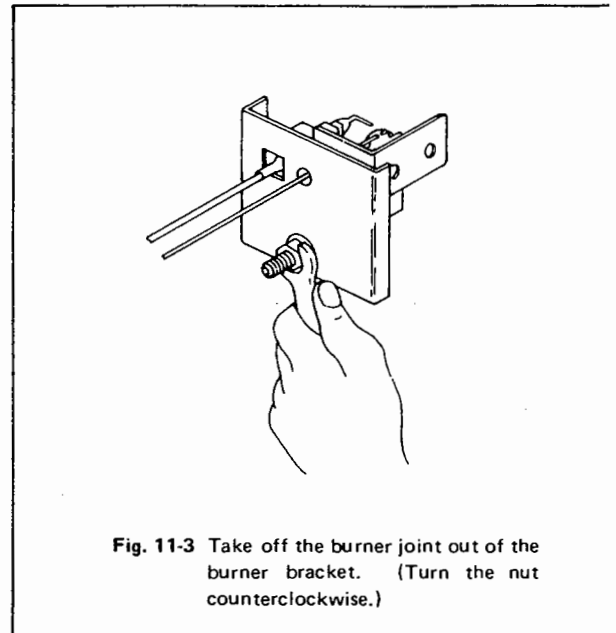
When the burner orifice is clogged, the flame will become too small on the maximum setting of thermostat which may affect the burner heating output and result in decrease of cooling efficiency. For taking out the clog or replacing the burner orifice, refer to Figs. 11-1 through 11-4.



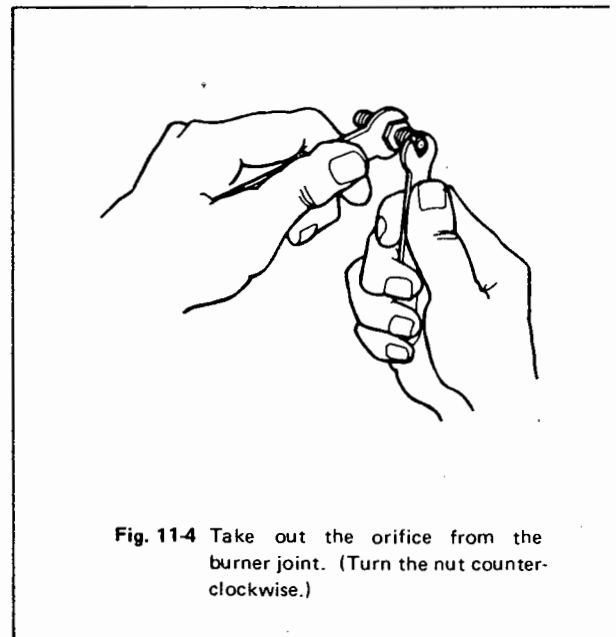
**Fig. 11-1** Remove the flame blow-out guard from the refrigerator by unscrewing 2 screws.



**Fig. 11-2** Remove the box nut of the gas pipe from the burner joint. (Turn the nut counterclockwise.)



**Fig. 11-3** Take off the burner joint out of the burner bracket. (Turn the nut counterclockwise.)



**Fig. 11-4** Take out the orifice from the burner joint. (Turn the nut counterclockwise.)

# 13. Service Hints For Burner

The burner flame extinguishes when the thermostat is set in action to reduce the flame into the size of the by-pass flame.

1. The feeler of the flame failure device is located too far away from the flame.

Remedy:

Check the bend of the burner bracket. If it is improper, bend it correctly or replace with a new one so that the feeler of the flame failure device can receive sufficient heat and performs normal function of opening.

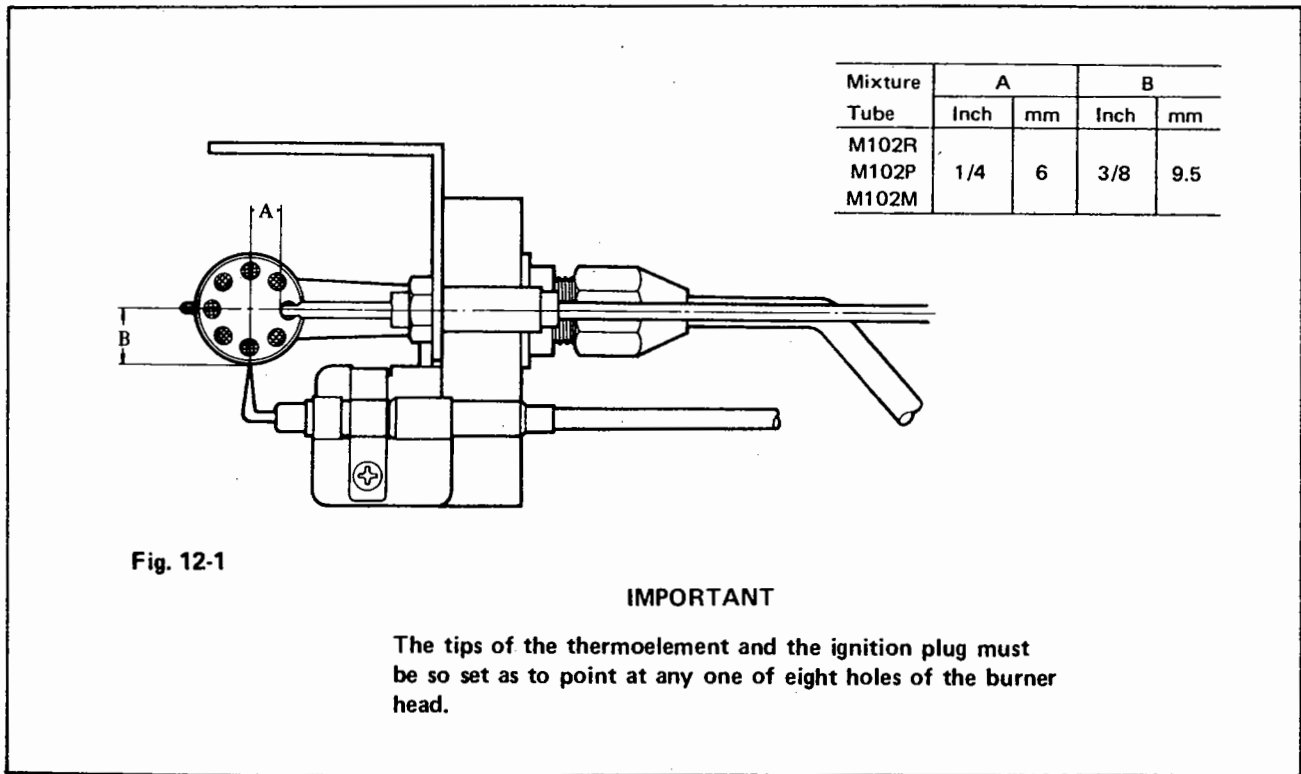
2. The connection between the thermoelement and the Safety Device is not screwed tight enough.

Remedy:

For correct connection, a torque ranging from 5 to 6 lb-inch is recommended.

The correct position of the feeler is shown in Figs. 12-1, 12-2. Setting dimensions as instructed should be maintained as shown in Figs. 12-1, 12-2.

3. Replace the thermoelement if it is found defective.



In case the burner ignition has to be repeated because of lighting failures.

1. At the first ignition, air may be present in the gas line. Push and turn counterclockwise the Gas On/Off Knob to "On" position and hold in FIRMLY for a period of approximate one (1) minute, so as to remove air in the pipe line.  
If not ignited, repeat this procedure.
2. The plug of the ignition device is positioned too far away from the burner head.  
Reset the plug or bend the bracket for the plug to make proper sparking.
3. The tip of the plug is not properly set at one of eight (8) holes of the burner head.  
Reset the plug bracket.
4. Clean the tip of the plug of ignition device when the soot is accumulated.
5. A short-circuit has resulted.  
Wind insulation tape around the lead wire, or replace the Ignition Plug (See Para. 19).  
Correct position to set the plug is shown in Figs. 12-1 and 12-2.

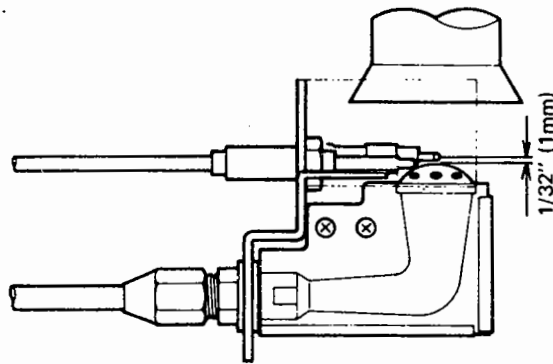


Fig. 12-2

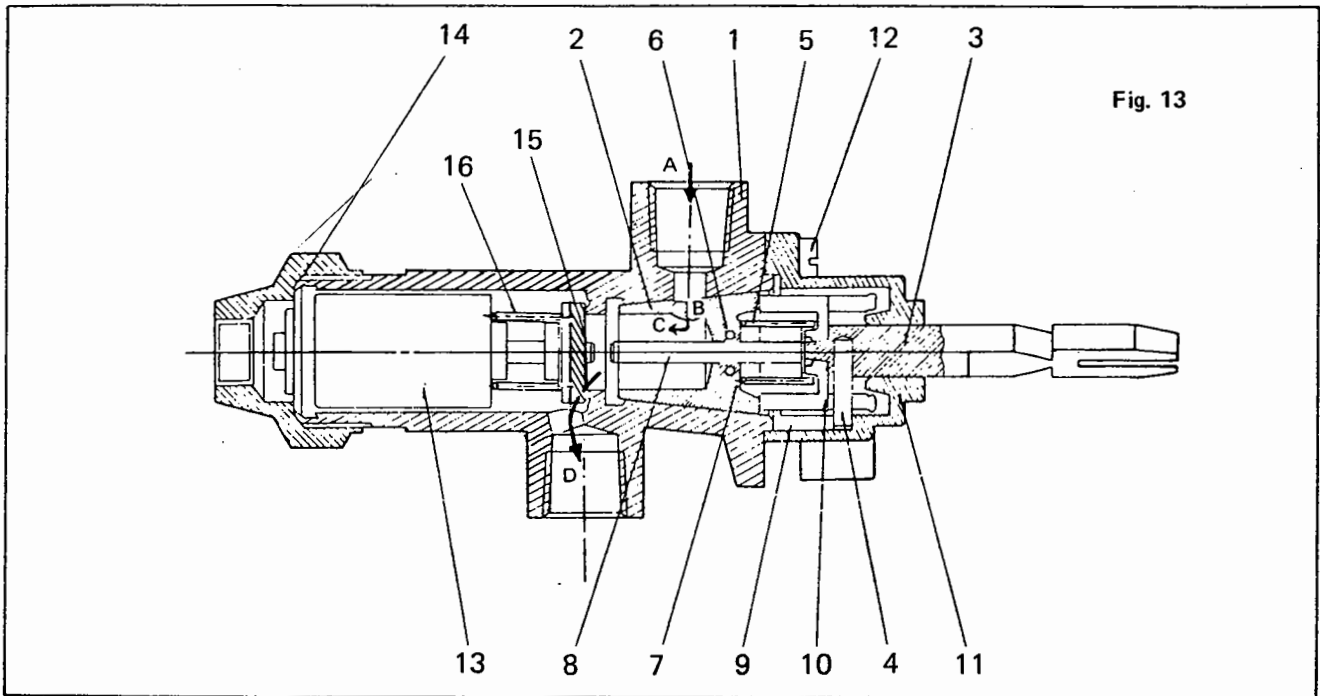
### IMPORTANT

The tips of the thermoelement and the plug of the ignition Device must be set at the same level and respective point must be flush with the top of the mixture tube as shown figure.

# 14. Automatic Flame Failure Safety Device

This failure device consists of the following parts.

- |             |                   |                  |                    |
|-------------|-------------------|------------------|--------------------|
| 1. Body     | 5. Spring         | 9. Spring Holder | 13. Electromagnet  |
| 2. Gas Cock | 6. Packing        | 10. Washer       | 14. Connecting Nut |
| 3. Rod      | 7. Washer         | 11. Body Cap     | 15. Valve          |
| 4. Stop Pin | 8. Connecting Rod | 12. Screw        | 16. Spring         |



The flame failure device functions as follows:

Push and turn counterclockwise the Rod (3) 90 degrees. The gas passes the housing (A) of the body (1) through the hole (B) of the gas cock (2) on to the housing (C). As the Rod (3) is being pushed, the Connection Rod (8) connected with the Rod (3) is designed to push the valve (15). Then, the gas in the housing (C) passes through the opening between the body (1) and the valve (15) to the housing (D) and on to the burner.

When the gas flame of the burner is lit, heat is transferred to the feeler. The feeler tip of the thermoelement connected with the electromagnet (13) is thus heated and an electric current is generated.

All while the electric current is supplied, electromagnet (13) attracts the valve (15), allowing the gas to go through the passage from A through D as shown in Fig. 13.

When the Rod (3) is kept down for 10 to 20 seconds after ignition, the tip of the thermoelement is heated to produce electromotive force, which is directed to the electromagnet (13) to create magnetic force. This magnetic force overcomes the force of the Spring (16), so that the valve (15) is kept in place firmly. Therefore, when the Rod (3) is released of hand, the valve (15) remains open, permitting the gas to continue flowing.

When a flame failure occurs, with the feeler tip cooled off, resulting in the electric current shut-off and demagnetization of the magnet, the valve (15) is closed with the spring load (16). Thus, the gas flow is stopped.

When extinguishing the flame, turn the Rod (3) clockwise. The hole (B) of the gas cock (2) is shut and the gas flow is stopped.

*If safety valve will not*

**IMPORTANT:** When lighting the burner, be sure to push the gas on/off knob firmly and turn slowly, unless otherwise the gas may not reach the burner properly.

## 15. Safety Device Adjustments

---

When the thermoelement is in the correct position, the nut, which holds the thermoelement to the bracket should be tight at all times. Make sure that the thermoelement tip is in the flame. Should the flame still go out as soon as the Gas On / Off Knob is released, check if the thermoelement Connection at safety valve shown by C in Fig.14 is tight. Check the electromagnet and thermoelement. If defective replace.

The flame blowouts can also be created by an excessive wind or passing truck (when the refrigerator is located at the left side of trailer—and some times on the right side too).

Check the installation.

## 16. How To Replace The Thermoement Of Safety Device-

1. Unscrew the plug (C) from the Safety Device (D).  
See Fig. 14.
2. Unscrew the nut (G) and release the thermoement (E) from the holder (F).
3. Bend the new thermoement in the same shape as the old element.
4. Put the feeler through the hole of the holder (F) and screw in the position nut (G) until it is tightened to the feeler.  
Then the feeler will automatically be in the correct position in relation to the burner flame.
5. Screw on the plug (C) to the Safety Device (D).  
The plug (C) must be properly tightened to the Safety Device (D) to ensure a good contact between the thermoement and the Safety Device (D).  
The optimum torque is approximately 5 to 6 1b-inch.

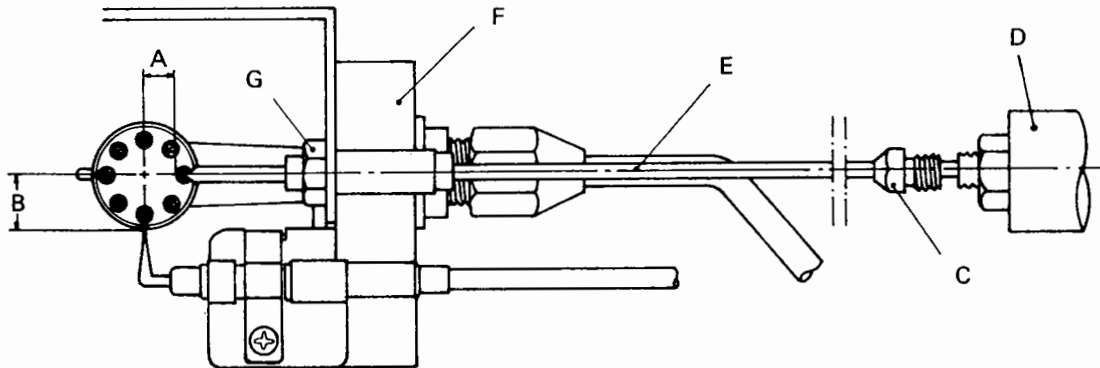


Fig. 14

C: Plug  
D: Safety Device  
E: Thermoement  
F: Holder  
G: Position Nut

Mixture Tube	A		B	
	Inch	mm	Inch	mm
M102R				
M102P	1/4	6	3/8	9.5
M102M				

# 17. Flue System

The flue system consists of the following parts:

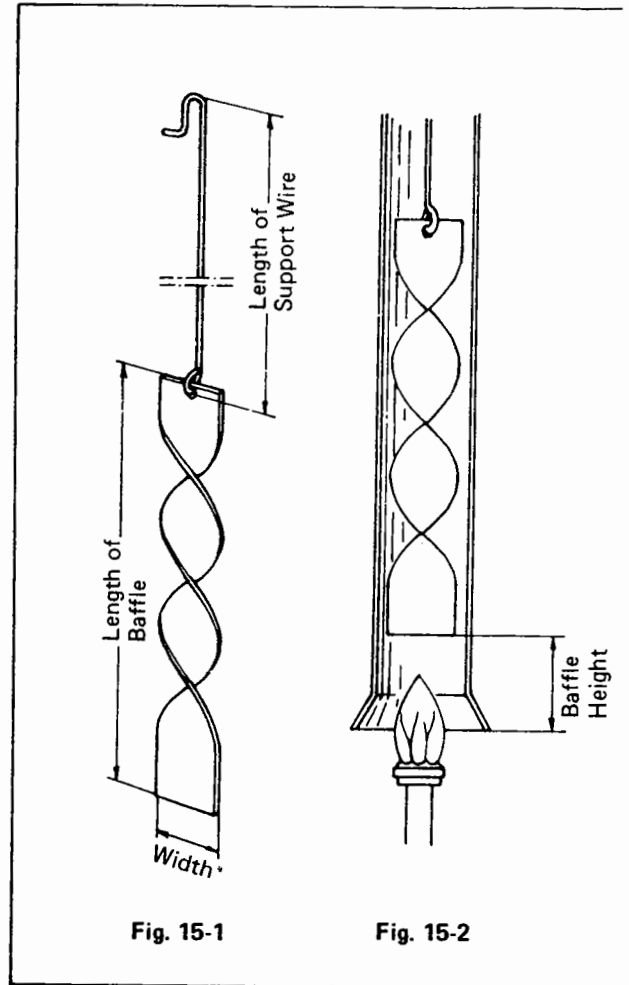
1. Flue Tube (built in part of the boiler system of the cooling unit and cannot be removed).
2. Flue with bracket.
3. Flue Baffle with support wire.

The purpose of the flue system is to provide a draft which will pull the burner flame into the flue tube and supply sufficient primary and secondary air to the flame.

The right flue draft will not be obtained before the burner has warmed up the flue system to the proper temperature.

The flue baffle which is inserted in the flue tube distributes the heat produced by the burner to the boiler system.

It is important that the correct size of baffle is used and that it is correctly located in the flue tube in order to obtain the best cooling performance. The size and the distance between the lower end of the baffle and the lower end of the flue tube for different refrigerator models are shown in Table below.



Model	Cooling Unit	Baffle Width x Length		Baffle Height		Length of Support Wire	
		mm	inch	mm	inch	mm	inch
SRA0321 SRA0331	833-0-0003-165-00	15.6 x 100	0.61" x 3.94"	135	5.31"	270	10.63"
SRA0621 SRA0631	833-0-0003-175-00	22 x 160	0.87" x 6.30"	47	1.85"	435	17.13"
SRA0721	833-0-0003-184-00	22 x 160	0.87" x 6.30"	100	3.94"	545	21.46"
SRA1221	833-0-0003-185-00	22 x 160	0.87" x 6.30"	100	3.94"	545	21.46"

Refer to Cooling Unit section of each Model's Spare Parts Lists.

## 18. Ignition Device

The ignition device consists of the following parts:

1. Piezo-ARC striking device
2. Ignition Plug
3. Ignition Insulator

The ignition devices used in all models can render permanent service, requiring no replacement.

The ignition devices use MATSUSHITA Piezo-ARC Stricking Mechanism Model EFI-AD223.

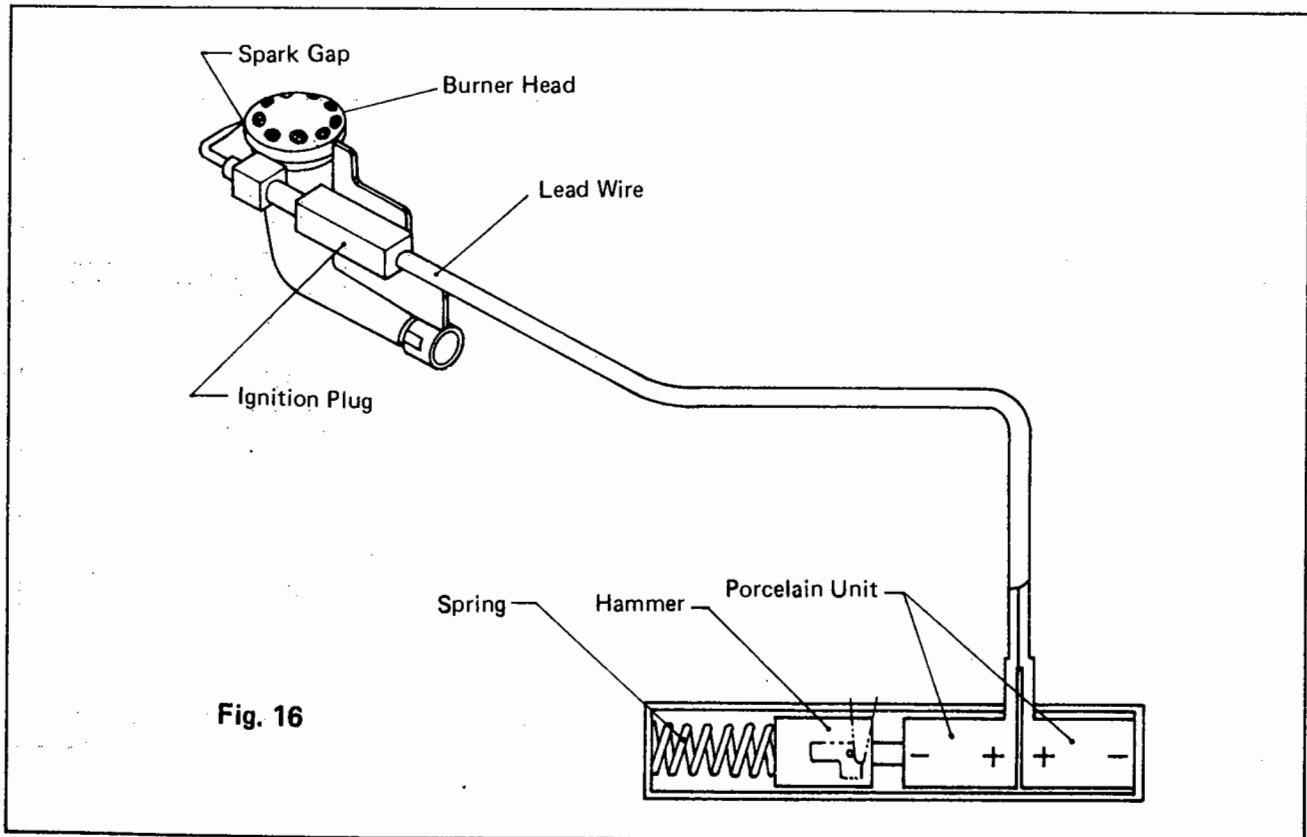
Igniting the burner is an operation that the end-user can perform by following the instructions which are provided in "Owner's Manual" and also on a sticker attached to the inside of the Front Apron of the refrigerator.

The ignition device functions as follows:

Push and turn the gas on/off knob, the hammer moves away from the piezo-ARC porcelain unit and strikes them. With identical poles faced each other, two (2) porcelain elements are housed in a single mold.

High electric voltage is generated at the both ends of the units. This electric current passes through the lead wire and causes spark between the ignition plug and the burner head, through which the current travels onto the metallic parts of the refrigerator.

When sparking occurs in the gaseous fuel, proper ignition is effected.





## 19. How To Replace The Ignition Plug

If when pushing and turning counterclockwise the gas on/off knob, spark occurs between the center of the ignition plug and its holder, the ignition plug may have been broken.

It is necessary to replace the failed ignition plug.

Proceed as follows for replacement.

1. Remove the ignition insulation tube without damaging the ignition lead wire.
2. Pull out the ignition plug by turning it counterclockwise.
3. Fit a new ignition plug by turning it clockwise.
4. Put a new insulation tube so as to cover the connection of the plug and the lead wire.
5. Apply uniform heat over the insulation tube made of thermosetting resin by means of a cigarette lighter or the like.

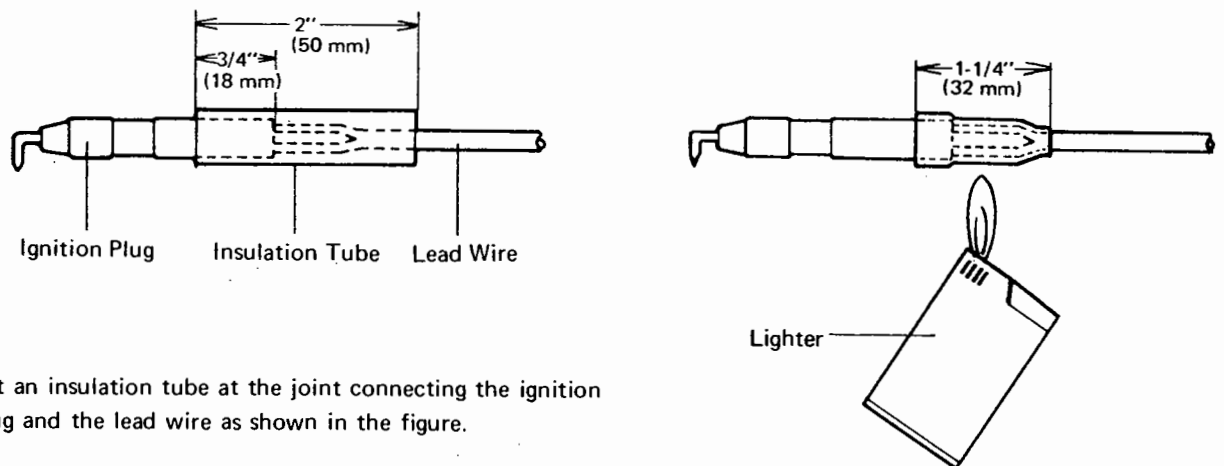
Be careful not to hold flame too close, as the insulation tube will be damaged.

### Ignition Device Adjustment

When pushing and turning gas on/off knob connected with the ignition device, fuel gas is not ignited despite of proper sparking.

In such a case, adjust the ignition tip as instructed in Para. 16

Turn to Figs. 12-1 and 12-2.



Put an insulation tube at the joint connecting the ignition plug and the lead wire as shown in the figure.

Fig. 17

Apply moderate heat all around the insulation tube (made of thermosetting resin) uniformly so that the tube is fitted firm in position.

## 20. Pressure Measuring Devices

### 20-1. Water U gauge

The water gauge consists of a glass U tube filled with water up to the mid-point. When gas pressure is exerted on one side of the gauge, the water on this side is forced down and there is a corresponding rise of water on the other side.

Water column pressure per square inch is indicated by the difference of the two columns of water measured in inches.

A convenient scale reading in inches and tenths of an inch is mounted between the two columns.

When reading the gauge, proceed as follows:

Fill the gauge with water up to the zero level. Connect the hose to the pressure testing outlet. Normal working pressure may force the water column to go down to 5.5 inches (140mm) below the zero level, whereas the other column rises up to 5.5 inches (140mm) above the point zero or mid-point. Adding the two will result in a water column of  $5.5 + 5.5 = 11$  inches (280mm).

For accuracy of measurement a water U gauge is far superior to a low pressure gauge. If a low pressure gauge is used, it should be checked for accuracy against a water U gauge occasionally.

### 20-2. Low pressure gauge (Fisher)

This gauge is calibrated to read in "inches of water column pressure". It is a standard manometer reading and is colored red.

How to use the pressure gauge

Fig. 18 shows the Fisher low pressure gauge and the water U gauge.

When testing the pressure on the different burners, remove the plug indicated with an arrow in Fig. 18 and fit the hose from the pressure gauge. It is very important that the gas-operated refrigerators operate at correct pressure, i.e. at the pressure specified for the refrigerator.

The pressure of the burner should be checked at the time the refrigerator is started up. After connecting the pressure gauge, set the thermostat dial to "COLDEST".

Turn on the gas and light the burner. At the "COLDEST" setting the pressure reading should be at a minimum 10-1/2" (267mm) or a maximum of 11-1/2" (292mm) if the L.P. gas is supplied directly to the refrigerator from the regulator fitted on the gas bottle at pressure of 11" (280mm).

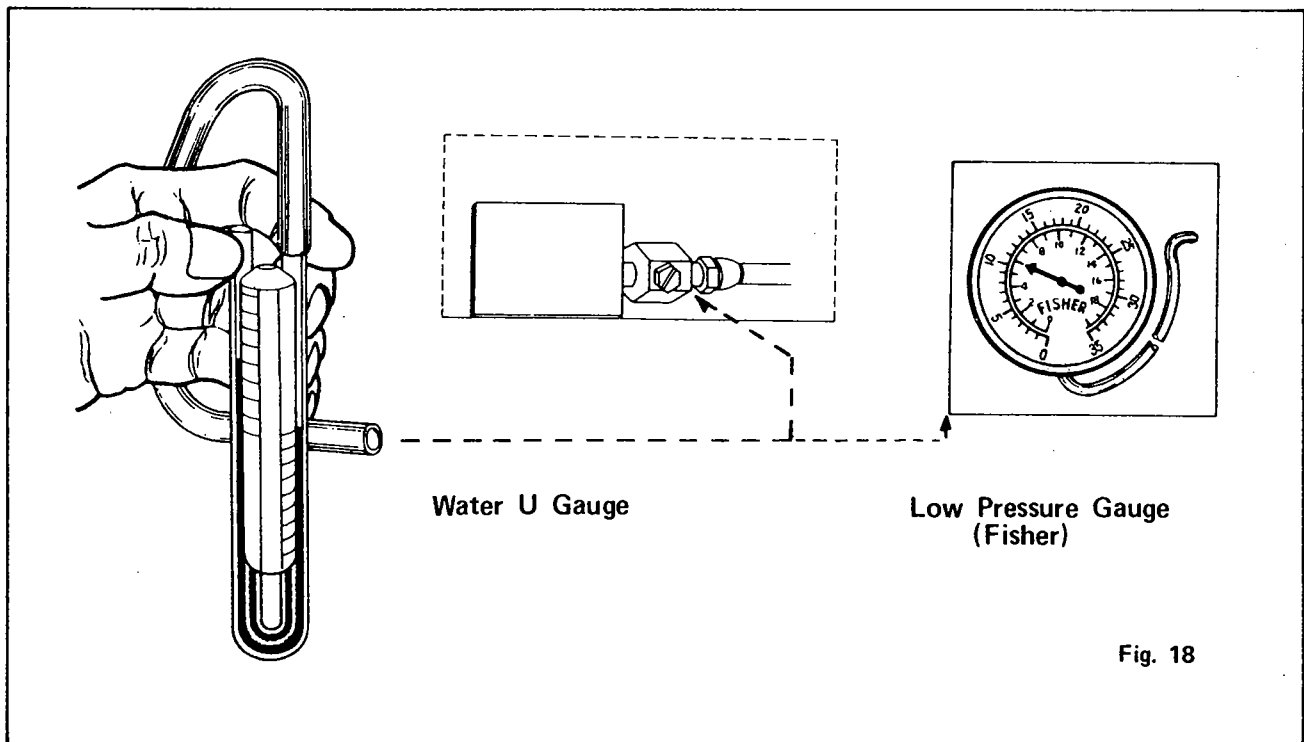


Fig. 18

### 20-3. Propane

At atmospheric pressure propane boils at -44° F.

At 189 pounds pressure, its boiling point is 100° F.

On a 70° F. day, propane will boil until gas pressure in supply cylinder, over liquid reaches 124 pounds.

A gallon of liquid propane will convert into 36.45 cubic feet of gas.

The average gas burner, using two (2) cubic feet of propane gas per hour, consumes the oxygen from nearly 50 cubic feet of air or about one-tenth of all air in an 8'x 12' cabin with 6.5' headroom.

Electricity: 3.4 B.T.U.s per watt.

Average LP-Gas capacities (PROPANE) (allow 20% for vapor space)

	<u>Lbs. of gas</u>	<u>BTU's</u>
1 - 5 gal. ICC tank	20	432,000
2 - 5 gal. ICC tank	40	864,000
1 - 7 gal. ICC tank	28	603,600
1 - 10 gal. ICC tank	40	864,000

	<u>Propane</u>	<u>Butane</u>
Pounds per gallon	4.24	4.84
Specific Gravity of gas	1.52	2.01
Specific Gravity of liquid	.509	.582
Cu. ft. gas per gallon liquid	36.3	31.5
Cu. ft. gas per pound	8.55	6.50
B.T.U. per gallon	91,500	102,600
B.T.U. per pound	21,560	21,180
B.T.U. per cu. ft.	2,522	3,261
Dew point in degrees F	44	24
Vapor pressure at 0° F	23.5	0
Vapor pressure at 70° F	124	31
Vapor pressure at 100° F	192	59
Vapor pressure at 110° F	223	71

11" of Water Column = 6 ozs. per Sq. In. Pressure

## 21. Replacement Of Heating Element In Gas Electric Refrigerators

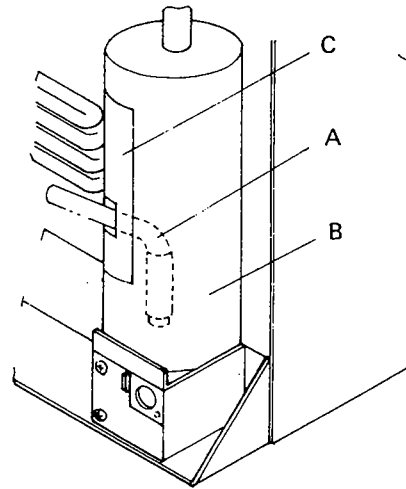
On the gas/electric operated refrigerators heat is supplied by an electric heater (A) mounted on the cooling unit inside the insulated cover (B). See Fig. 19-1

The heater is accessible for replacement after removal of shutter (C) and the glass wool insulation.

- 1) Check that the size and wattage of the heater are correct for the unit in use.
- 2) Check that the supply voltage corresponds to the voltage stamped on the heating element.
- 3) Make sure that the heater is inserted to its full length in its pocket.
- 4) Be careful to put the insulation in its proper place again after replacement.

Note:

The edges of the opening in the cover may be sharp!



A: Electric Heater  
B: Insulation Cover  
C: Shutter

Fig. 19-1

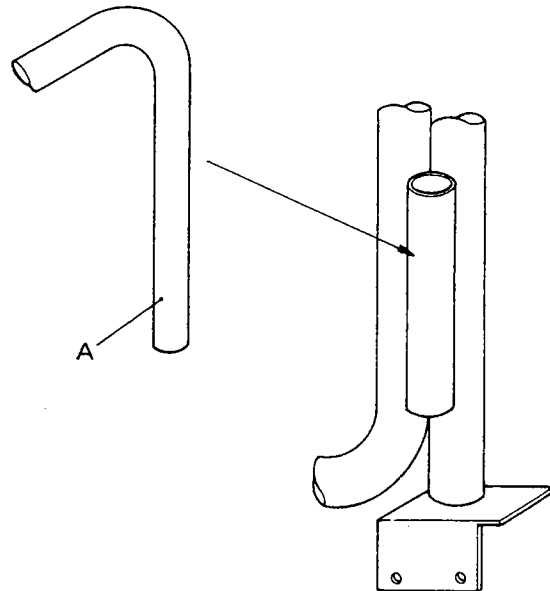


Fig. 19-2

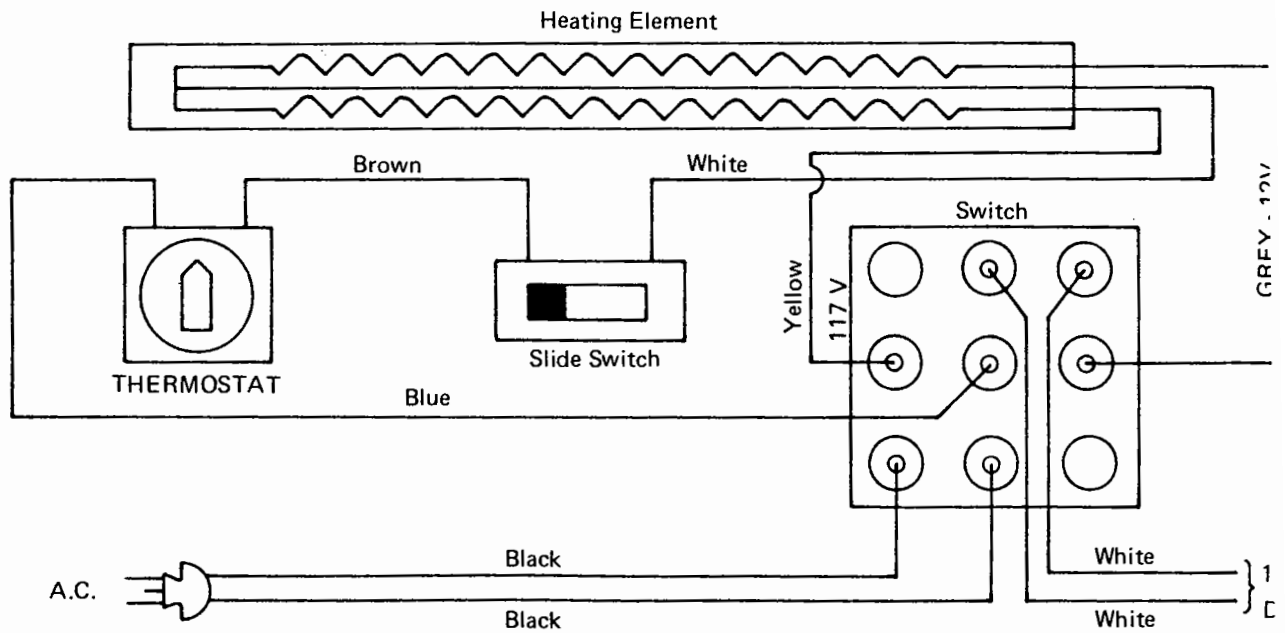
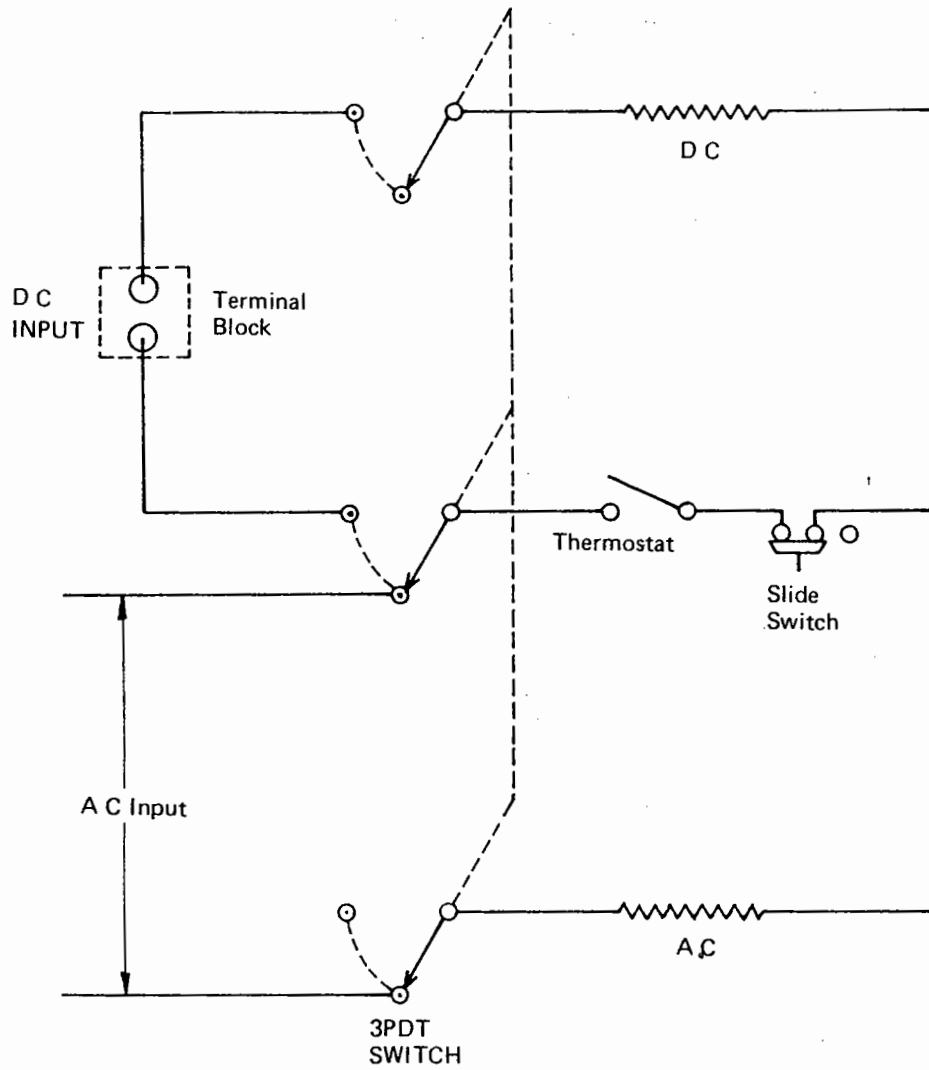


Fig. 20

## 22. Power, Current, Resistance Chart

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SRA0321	130 Watt	117 Volts	1.11 Amps	105.40 Ohms
SRA0621	200 "	117 "	1.71 "	68.42 "
SRA0721	265 "	117 "	2.26 "	51.76 "
SRA1221	296 "	117 "	2.53 "	46.24 "
SRA0331	130 Watt	12 Volts	10.833 Amps	1.11 Ohms
SRA0631	180 "	12 "	15.0 "	.80 "

Ohms Law states: Power in watts (P) = Current in Amps. (I) Times volts in volts (E)  
or  $P=IE$  and  $I=P/E$

Then Ohms Law states: Volts in volts (E) = Current in Amps. (I) Times resistance in Ohms (R)  
or  $E=IR$  and  $R=E/I$

The resistance is so small it requires very expensive equipment to be able to measure with any degree of accuracy. It is therefore, found with much more ease using a "Volt-Watt" meter. We have found the "Simpson Model 392" to be very effective for this purpose. It will read directly in volts and watts in the 117 volt function.

For measuring power at 12 volts it is simpler to use an Ammeter to measure the current in Amps. The table above may be used in this case.

Resistance at 25° C. or 77° F.

	P.F.	10'	20'	30'
No. 14	.00305	.0305	.061	.0915
No. 12	.00192	.0192	.0384	.0576
No. 10	.00124	.0124	.0248	.0372
No. 8	.000726	.00726	.01452	.02178
No. 6	.000444	.00444	.00888	.01332

SRA0331 130W - 10.833 Amps - 12 Volts

Power Loss in Watts

10' of No. 14 =	.32	Volt Drop	2.7%	3.38
20' " " =	.63	" "	5.2%	6.41
30' " " =	.91	" "	7.6%	8.35

10' of No. 12 =	.20	Volt Drop	1.7%	2.17
20' " " =	.40	" "	3.3%	4.19
30' " " =	.59	" "	4.9%	6.08

10' of No. 10 =	.13	Volt Drop	1.1%	1.42
20' " " =	.26	" "	2.1%	2.77
30' " " =	.39	" "	3.2%	4.07

10' of No. 8 =	.08	Volt Drop	.6%	.83
20' " " =	.15	" "	1.3%	1.65
30' " " =	.23	" "	1.9%	2.45

10' of No. 6 =	.05	Volt Drop	.4%	.51
20' " " =	.10	" "	.8%	1.02
30' " " =	.14	" "	1.2%	1.51

SRA0631 180W - 15.000 Amps - 12 Volts

10' of No. 14 =	.44	Volt Drop	3.7%	6.36
20' " " =	.85	" "	7.1%	11.85
30' " " =	1.23	" "	10.3%	16.57

10' of No. 12 =	.28	Volt Drop	2.3%	4.12
20' " " =	.55	" "	4.6%	7.86
30' " " =	.81	" "	6.7%	11.26

10' of No. 10 =	.18	Volt Drop	1.5%	2.70
20' " " =	.36	" "	3.0%	5.24
30' " " =	.53	" "	4.4%	7.64

(SRA0631 cont'd)

Power Loss in Watts

---

10' of No. 8	=	.11	Volt Drop	.9%	1.59
20' " "	=	.21	" "	1.8%	3.14
30' " "	=	.32	" "	2.7%	4.64

---

10' of No. 6	=	.07	Volt Drop	.6%	.98
20' " "	=	.13	" "	1.1%	1.94
30' " "	=	.20	" "	1.6%	2.89

---



## 23. Heating Elements For Different Refrigerators

Model	Cooling Unit Type No.	Heater Parts No.	Wattage (W)	Voltage (V)
SRA0321	833-0-0003-165-00	4-2459-431-43	130	AC117
SRA0331		4-2459-431-27	130	AC117 DC12
SRA0621	833-0-0003-175-00	4-2459-431-44	200	AC117
SRA0631		4-2459-431-28	AC200 DC180	AC117 DC12
SRA0721	833-0-0003-184-00	4-2459-431-29	265	AC117
SRA1221	833-0-0003-185-00	4-2459-431-30	296	AC117

Refer to Cooling Unit section of each Model's Spare Parts Lists.

## 24. Service Hints For Electric Operated Refrigerators

---

<u>Cause</u>	<u>Remedy</u>
<u>a. The refrigerator does not cool satisfactorily.</u>	
Thermostat at wrong setting	Turn clockwise the thermostat dial or to the colder setting.
Air circulation over cooling unit restricted	Remove any restriction. The minimum clearances stated in para. 5 for air circulation must be allowed.
Refrigerator not level	The refrigerator must be level in both directions for proper operation. If in a caravan, always make sure it is level when parked. See paras. 3, 4 and 25.
Air leakage into cabinet	Check fit of door gasket, and that the sealing plug is in the hole for the thermostat capillary in the rear wall of cabinet. See para. 33.
Evaporator heavily coated with frost	If the cooling unit is not equipped with an automatic defrosting device, defrost at more frequent intervals. Also see paras. 28 and 33.
Heater faulty, wrong voltage or type	Fit a new heater of rated voltage (See para. 23).
Intermittent electricity supply	Look for loose connections or other reason for interruption, and correct.
Drop in supply voltage.	The supply voltage should be maintained at the full rate.
Thermostat at "DEFROST"	Turn thermostat dial to colder setting.
Electric circuit failures.	Check switches, wiring etc., and repair the defects.
Heater faulty (open circuit)	Fit a new heater (See para. 21).
Thermostat faulty	Have a new thermostat fitted.
<u>b. The refrigerator is too cold.</u>	
Thermostat at wrong setting	Turn the thermostat dial to warmer setting.
Improper locating of the thermosensing tube	Re-fasten the tube on the holder located at the evaporator. See para. 27.
Thermostat faulty	Have new thermostat fitted.

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## 25. Leveling

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In the boiler of the cooling unit, ammonia vapor is distilled from an ammonia-water mixture and carried to the finned condenser where it liquefies. The liquid flows to the evaporator inside the cabinet where it cools, evaporating into a circulating flow of hydrogen gas. If the evaporator is not level the liquid readily accumulates, forming pockets which can impair the gas circulation or block it completely, resulting in suspension of cooling action.

When the trailer is stationary, it must be leveled to be comfortable to live in. If the refrigerator is properly installed, i.e. the ice-tray compartment shelf is parallel with the floor, the refrigerator will operate properly.

With the level placed on the ice-tray compartment and check to see the position of the bubble (if necessary with the aid of a small mirror).

Adjust the position of the trailer so that the bubble is in the center ring of the level.

When the trailer is on tow, the continuous rolling pitching movement will not affect the refrigerator as long as the movement passes either side of level. When the trailer is temporarily parked, the sensitivity of the refrigerator should be kept in mind.

## 26. Temperature Control (Thermostat)

---

- a) When the thermostat is set at colder setting, refrigerating effect will be increased. This will tend to lower the temperature in the freezing compartment and in the food storage compartment.  
When the thermostat is set at warmer setting, refrigerating effect will be decreased.  
When the thermostat is set at mid-dial position, medium refrigerating effect will be produced.

- b) The setting position of the thermostat should depend upon the refrigerator load.  
When the food load is heavy, turn the thermostat to the colder setting.  
The colder setting of the thermostat will be required in summer than in winter season.  
The setting of the thermostat determines the actual compartment temperatures in relation to food storage compartment temperatures.

## 27. Thermostat Sensing Tube

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The thermostat sensing tube must be fastened on the holder located at the evaporator. If the sensing tube end is not properly fastened on the holder, the burner will operate continuously at maximum flame. It will cause too low cabinet temperatures.

## 28. Storing Food In The Refrigerator

---

- a) Proper refrigeration requires free air circulation within the food storage compartment. Restricted air circulation within the food storage compartment will cause higher cabinet temperatures. Rearrange foods.
- b) It is also essential that the shelves are not covered with paper or large storage containers.
- c) Odorous foods or highly flavored foods should always be stored in covered dishes, plastic bags or wrapped in foil or waxed paper, to prevent food odors. Vegetables, lettuce, etc., should be covered to retain their crispness. Never put hot food into the refrigerator.
- d) To reduce frost formation in and on the freezing compartment, cover stored liquids and moist foods and do not leave the door open longer than necessary.
- e) When the refrigerator is heavily loaded, it takes longer for refrigerator temperatures to lower, requiring much longer time for ice-making. A very heavy load may also cause defrosting.

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## 29. Cleaning

---

The cabinet interior should be cleaned regularly. Remove the shelves and wash the lining with lukewarm water to which a little soap flakes may be added. Dry thoroughly, especially around door frames and door gasket. Warm water only should be used to wash the cooling evaporator, ice-trays and shelves.

Plastic dishes may be washed in warm soapy water - not hotter than is bearable to the hand. Do not expose them to dry heat. Never use strong chemicals or abrasive cleaning materials on any part of the cabinet.

## 30. Ice Cubes

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- a) Do not use warm water, as it takes longer to freeze.
- b) Faster freezing will result if precooled water is used.

## 31. Travel Lock

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The travel latch may be fitted to hold door(s) closed while in transit.

## 32. To Shut Off The Cabinet

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If for any reason refrigeration is not required over a period of weeks, the gas taps or electric switch should be turned off.

The cabinet and ice trays should be emptied, cleaned and dried.

It is advisable to keep the door open a little when not in use for longer period of time.

## 33. Door Seal

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- a) It is essential, for correct operation, that the door gasket makes a good seal all around, against the front of the cabinet.

The gasket should just contact the front of the cabinet when the door is closed. This is normally allowed for during manufacturing.

Failure of the door gasket to contact the front of the cabinet can be determined visually when the door is closed. Run a piece of thin cardboard along the door seal, inserted between the gasket and the cabinet front. Nowhere should the card feel loose.

- b) Improper door sealing on cabinets provided with magnetic door gasket can be corrected by slackening the upper and lower hinge fixing screws and moving the door inwards or outwards by inserting or removing a washer to correct the door as required until a satisfactory seal is obtained.

If good seal cannot be obtained, a new gasket should be fitted.

- c) It is also essential to check that the cabinet opening through which the freezing compartment enters the cabinet should be properly sealed by a gasket. If these seals leak, warm air enters the cabinet causing high cabinet temperatures and excessive frost formation on the freezing compartment.

## 34. Flue Obstructions

---

On gas refrigerators, the flue will require occasional cleaning. To do this it will be necessary to gain access to the back of the cabinet. When cleaning the flue proceed as follows:

Unscrew the flame blow-out guard. Cover the entire burner assembly (See Figs. 11-1 through 11-4, and 12-1, 12-2) with a piece of rag, then lift out the baffle on its support wire from the top of the flue tube.

From the top, clean the flue with a suitable flue brush. Also clean the baffle, before putting back in place.

An obstruction in the flue will reduce or stop flue draft. Flue obstructions will cause odors outside refrigerator, slow freezing and higher cabinet temperatures. Flue blockage may also cause the flame to burn outside the flue tube.

## 35. Odors Inside The Refrigerator

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Odors inside the refrigerator are caused by improper food storage (See para. 28).

They may also be caused by too infrequent cleaning of the food compartment or the refrigerator has been shut off for some time with the door closed.

## 36. Odors From Fumes

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a) Odors outside the refrigerator may be caused by gas leaks. Make sure that all burner gascocks on all gas appliances are closed.

Test gas connections and all joints in the gas line with soap and water solution, up to and including gas cock. Never look for a leak with an open flame. Use a flashlight when necessary in looking for soap bubbles caused by leaks. The gas line should be free of kinks and sharp bends.

Turn on gas cock, light burner and test connections between the gas cock and the burner carefully with soap and water.

b) Odors outside the refrigerator may be caused by improper burner flame.

c) The flame touches side of the flue tube due to dislocation of the burner. Relocate. Burner dislocation may also cause smoking and soot-ing of walls and ceiling.

d) Burner damaged. Replace.

e) The flame touches flue baffle. Correct position of baffle.

f) The flue tube is dirty. Clean the flue. Turn to Fig. 8-3.

## 37. Flame Blows Out

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If trouble is encountered with the flame blowing out under specially windy conditions, try to place the vehicle so that the wind does not blow directly into the vent outlets.

Check and seal the gap of the refrigerator and sealing wall, and be careful not to make gaps of the control panel and underflame. If the trouble persists, set the thermostat at "COLDEST". This latter method can of course only be temporary such as when the caravan is on tow, for after several hours at this setting the foodstuffs in the cabinet may become too cold.

## 38. Lost Thermostat Charge

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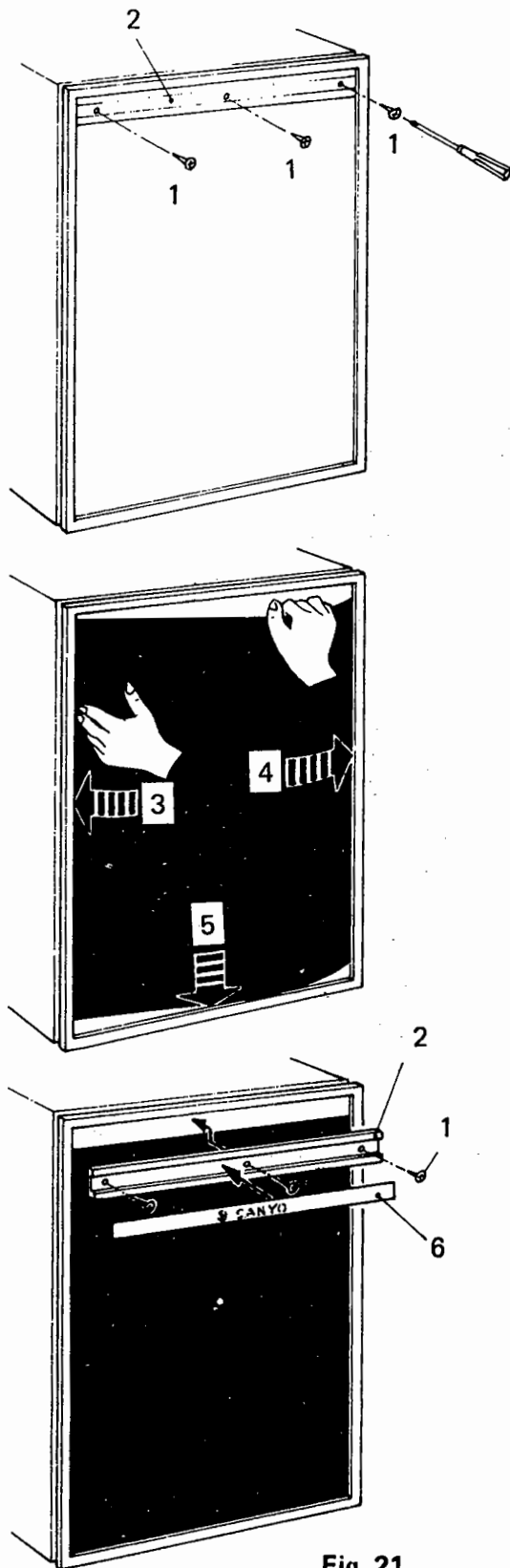
If the thermostat control assembly loses its charge, it will become inactive.

Make a lost charge test in case the flame stays minimum despite of the proper setting up of the thermostat.

Proceed as follows for the test:

Removing the sensing tube from the holder at the evaporator, warm up the free end of the capillary tube by holding it with the palm of the hand. If the flame fails to magnify in size, the thermostat has lost its charge and the thermostat must be replaced.

### 39. Instruction For Mounting The Door Panel



The refrigerator is normally delivered without door panel. When mounting the panel, proceed as follows.

1. Remove the top decoration base (2) with its three screws (1).
2. Insert one of the vertical edges of the panel into the groove of the door frame (3).
3. Bend the panel gently so that the free side of the panel can be slipped into the corresponding groove of the door frame (4).
4. Push the panel downwards so that the lower horizontal edge of the panel is fitted into the bottom groove (5).
5. Between the upper edge of the panel and the door frame there is now a gap which should be covered by the decoration base.
6. Put the base across the door so that the gap is covered. Secure the decoration base by means of the three screws (1).
7. Peel off the ground paper of the label (6), attach it to the decoration base.

Fig. 21



## 40. Changing Door Operating From Left To Right

### 40-1. One Door Type

This door hinging is so designed to make either right-hand or left-hand door opening.

To change the opening:

1. Unscrew and remove top hinge pin.
2. Remove door.
3. Unscrew and remove bottom hinge pin and fit it to opposite side.
4. Fit door to bottom hinge.
5. Change the travel latch to opposite side.

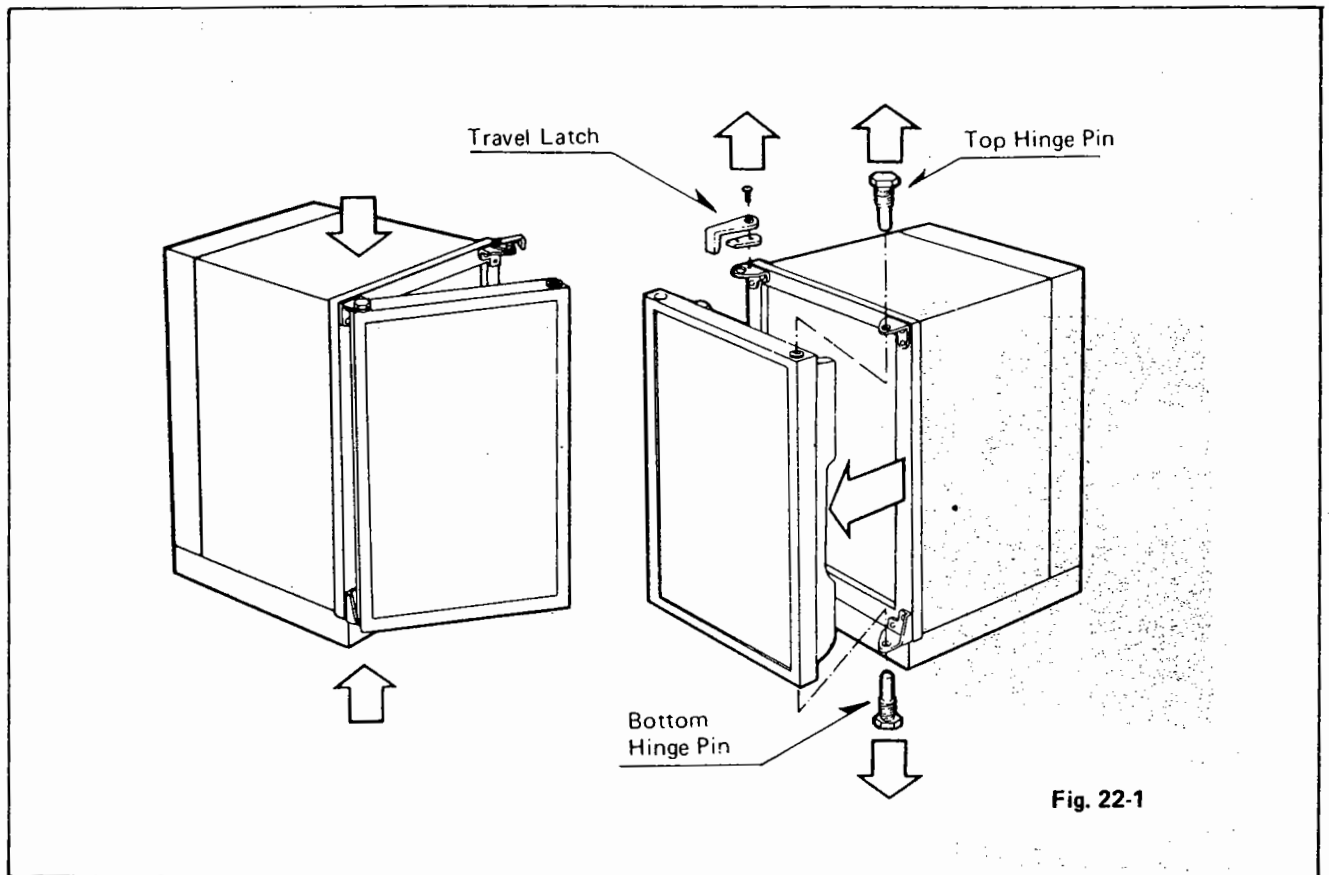


Fig. 22-1

## 40-2. Two Door Type

This door hinging is so designed to make either right-hand or left-hand door opening.

To change the opening:

1. Unscrew and remove top hinge pin.
2. Remove freezer door.
3. Unscrew and remove center hinge pin.
4. Remove food storage door.
5. Unscrew and remove travel latch, center hinge and corner plates (top and bottom).
6. Unscrew and remove hinge A and fix it to opposite lower side.
7. Unscrew and remove hinge B and bottom hinge pin, and fix hinge B to opposite upper side.
8. Fix the travel latch, center hinge and corner plate to opposite side.
9. Fit the bottom hinge pin to hinge A.
10. Set food storage door.
11. Fit center hinge pin.
12. Set freezer door.
13. Fit top hinge pin.

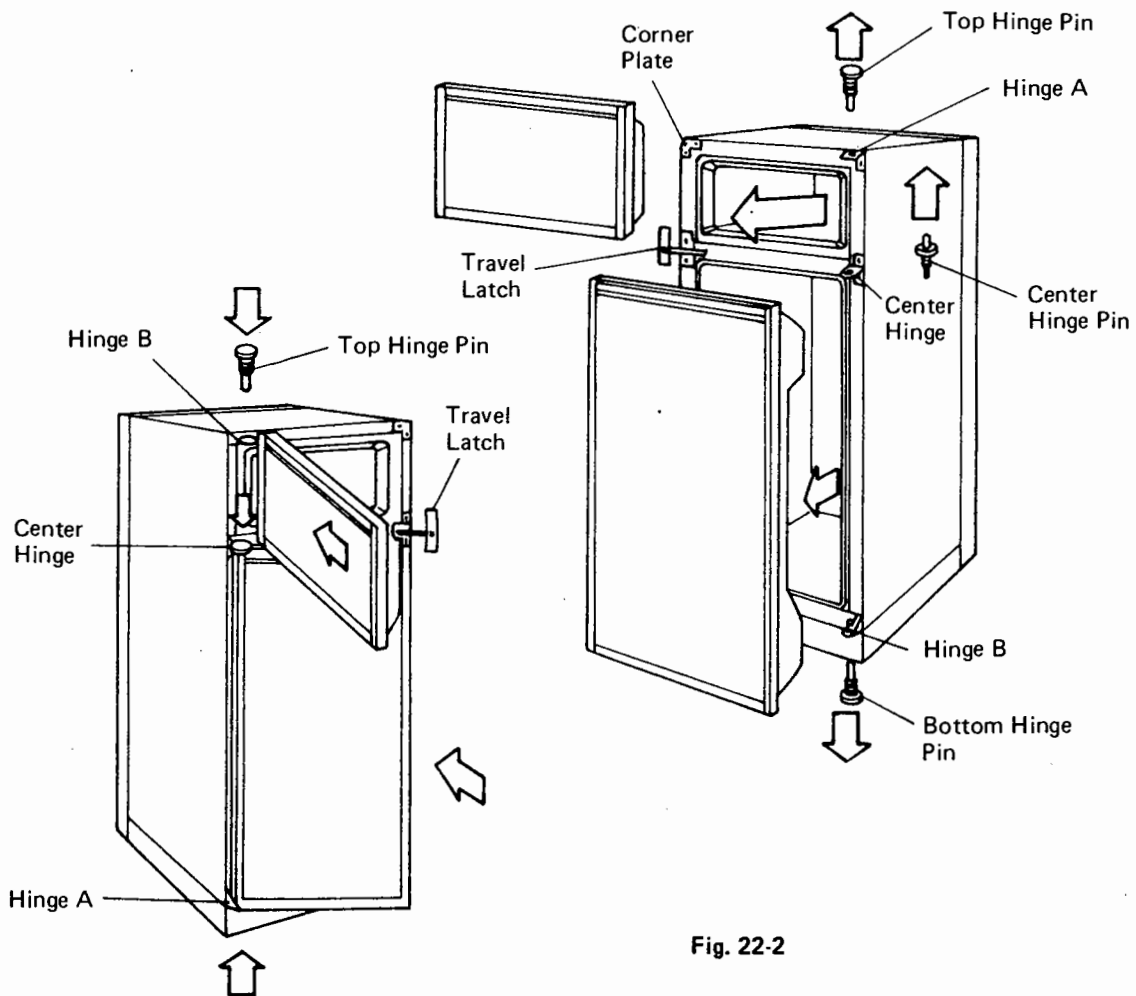


Fig. 22-2

## 41. Operation Analysis For Cooling Unit

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It is obviously important that all external factors affecting the unit should be checked properly before a unit is condemned as faulty and that emphasis has been placed upon the necessity for correct installation, upright refrigerator, correct heat input, baffle position, etc. If the refrigerator is the gas/electric model, check the size and the wattage of the electric heater and make sure that the heater element is inserted to its full length in its pocket or receptacle. See Figs. 19-1 and 19-2. If the electric heater is only partly inserted, the heat distribution will be incorrect, causing an excessive vaporizing of the ammonia within the boiler when operating on electricity. The same symptom can show up with too much or too little heat input either on electric or on gas operation and also if the refrigerator had been operating in an off-level position or with inadequate ventilation.

If an excessive vaporizing of the ammonia within the boiler occurs due to the above causes, the liquid mixture in the boiler becomes very weak and the pump will cease to operate, which means that the circulation of liquid stops with the result that the evaporator inside the cabinet ceases to produce cooling.

Such a blockage of the unit in the liquid circuit is most usually made evident by signs of overheating on the vapour pipe leading from the boiler to the condenser, the paint on this pipe being blistered and the metal becoming discoloured.

To remedy this fault it is recommended to remove the unit or refrigerator complete whenever possible and to allow sufficient time to cool down the unit. Turn the unit or refrigerator upside down several times, so that

the liquid in the absorber vessel can be mixed with the liquid in the boiler. This procedure will restore the liquid balance in the unit.

Start the unit on "COLDEST".

The temperatures on various parts of a unit vary continuously when it is operating on thermostatic control and it is impossible to base a judgement on the symptoms given unless the refrigerator has been operating continuously on fully correct heat input for at least 5 hours, and preferably 12 hours, prior to examination. In many cases this can be arranged by a telephone call to the customer, asking him to switch the thermostat to "COLDEST" on the day before the inspection call. If after 12 hours' operation on "COLDEST", the performance is satisfactory, the unit is not at fault unless the complaint is one of varying or intermittent performance. In this connection the room temperature at the time of the complaint must be considered, as a unit which is satisfactory at an ambient temperature of 50° F may not be satisfactory at 95° F.

In cases where satisfactory performance is obtained on "COLDEST" but not on other settings, the thermostat is to be suspected.

When a normal unit is working on "COLDEST" the absorber coil will be warmer at the bottom than at the top. The absorber vessel will be warmer. The vapor cooling pipe from the boiler to the condenser will be warm, bearable to the hand, at the bend where it joins the condenser, with a gradual rise in temperature towards the boiler end.

## 42. Unit Filling Valve

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The needle valve used for admitting the filling charge to a cooling unit is fitted to the unit's absorber vessel and is covered by a plastic cap. It is strictly applied provision of the warranty extended on the unit to the customer, the any interference with the filling valve will automatically void the warranty.

Unsatisfactory unit performance due to an ammonia leak can be determined in the case of a visible leak by traces of a yellow deposit at the point where the ammonia is bleeding. If there is a leak on the evaporator inside the cabinet, ammonia smell may result.



# 45. Operation Analysis For Refrigerator Operating On Electricity

SYMPTOM					See paragraph No.	CAUSE
Refrigerator too cold	Refrigerator not cold enough	No refrigeration	Frost forms rapidly	Odor inside cabinet		
	X	X			5	Not adequate ventilation
	X	X			25	Refrigerating unit not level
	X	X			23, 24	Heater faulty, wrong voltage or type
	X	X			24	Voltage not constant
		X			24	Electric connections loose
	X	X			21	Heater not inserted correctly in its pocket
	X	X			28	Improper food storage
X	X	X			26	The thermostat incorrectly used
			X		28, 33	Improper storage of liquids and moist foods
	X	X	X		33	Leaky cabinet seals
				X	29	Infrequent cleaning of food compartment
				X	32	Refrigerator shut off with closed door
				X	28	Unwrapped odorous food
X			X		27	Incomplete contact of Sensing Tube
	X	X			38	Lost thermostat charge
	X	X			41, 43	Failed refrigerating unit
X					26	Room temperature too low

Note: It will be noted in this tabulation that several causes can be responsible for the one effect. The real cause or causes should be determined by a process of elimination, investigating each possible cause, starting at the top of the tabulation and proceeding to the bottom.

## 46. Operation Analysis For Refrigerator Operating On Gas

SYMPTOM							See paragraph No.	CAUSE
Refrigerator too cold	Refrigerator not cold enough	No refrigeration	Frost forms rapidly	Burner flame goes out	Odor inside cabinet	Odor outside cabinet		
						X	6, 36	Gas leaks
	X	X					5	No adequate ventilation
	X	X					25	Refrigerating unit not level
	X	X		X			12	Orifice clogged
				X			13	The thermocouple tip not in position
				X			14	No contact between thermocouple and safety valve magnet
				X			14	Faulty safety valve magnet
	X	X					12	Improper maximum flame
				X			8-4	By-pass flame too small
	X	X		X			12	Burner head clogged
X			X				8-3	Dirt in thermostat or valve seat
X			X				8-3	By-pass flame too large
	X	X		X			17	Improper position of the flue baffle
	X	X					11-1, 11-2, 20	Unstable burner flame
	X	X					28	Improper food storage
X	X	X					26	The thermostat incorrectly used
			X				28, 33	Improper storage of liquid and moist foods
	X	X	X				33	Leaky cabinet seals
	X	X	X			X	34	Obstructed flue
						X	36	Flame contacts flue tube
						X	11-2	Insufficient primary air
					X		29	Infrequent cleaning of food compartment
					X		32	Refrigerator shut off with closed door
					X		28	Unwrapped odorous food
X			X				27	Incomplete contact of thermostat tube
	X	X					38	Lost thermostat charge
	X	X					41, 43	Failed refrigerating unit
X							26	Room temperature too low